VOLUME II.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1919.

No. 17, Original.

THE STATE OF NORTH DAKOTA, COMPLAINANT,

vs.

THE STATE OF MINNESOTA.

IN EQUITY.

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A. Yes, sir, the same figures were running between those two points.

Q. From Station 10 on?

A. From Station 10 to Station 15 is the same elevation, but at Station 15 it is 994.6.

Q. And that continues to?

A. Station 20, 994.4; Station 25, 994.2; Station 30, 994.1; Station 35, 993.9; Station 40, 993.7; Station 45, 993.6; Station 50, 993.4; Station 55, 993.2; Station 60, 993.1; Station 65, 992.9; Station 70, 992.7; Station 75, 992.6; Station 80, 992.4; Station 85, 992.2; Station 90, 991.6; Station 110, 991.4; Station 115, 991.2; Station 120, 991.0; Station 125, 989.5; Station 130, 988, and that carried down into the, where it joined the old Mustinka river through the cut-off.

Q. Then as I understand it, this part of the last construction that we call the cut-off was 132 stations, that is, 13,200 feet in length?

942 A. Yes, sir.

Q. And you have given the dimensions for that?

A. Yes, sir.

Q. This brings you to the junction of the cut-off with the old Mustinka river?

A. Yes, sir.

Q. And continuing down-stream can you give us a few of the stations below that, so that we can get a general idea of the top width and the depth of the cut, beginning, say at Station 135?

A. Station 135, bottom datum line 986.5.

Q. The top width?

A. Top width I haven't got here. The width of the cut was 40 feet, 3 feet from the bottom up; the top width I couldn't say.

Q. That was in the channel of the old river?

A. That was in the channel of the old river, yes, sir. The cut there was 3.5 feet.

Q. That would be below the bottom of the former channel?

A. Yes, sir.

Q. Skip down, we will say, to 150.

A. I want to state here that at Station 150 Mr. Ralph planned a cut-off from Station 150 to 159, that would be nine stations, 900 feet, but Mr. Willard changed that and followed the old channel of the river.

Q. Have you the figures on the correction, the channel as it was actually made?

A. Yes, sir. Here at Station 150 Mr. Willard started with 149-0, 149-1 and so on down, until he came to the station where Mr. Ralph's figures——

Q. What do you mean by 149?

A. You see, the channel was longer around than it was

943 across. This 150 then was in the channel as you followed it around the bend, the 150 is at the upper end of this cut-off, what is the supposed cut-off.

Q. What is the depth of the cut there in the bottom of the channel as rectified?

A. At Station 150, 4.9. Now you want ten stations from there on——

Mr. Bronson:

Q. What does the 4.9 represent?

A. Depth of cut below the bottom of the old channel.

Mr. Palmer:

Q. Give me ten stations below that?

A. I have to give you Station 149-10, the cut is 5.3 feet.

Q. As I understand it, Mr. Ringdahl, the original plan was to make a cut-off there?

A. Yes, sir.

Q. And those stations were numbered consecutively right across this neck of land?

A. Yes, sir.

Q. Mr. Willard in making this modification, the ditch being planned to leave the channel at 149, he went on around the bend and divided that into a sufficient number of stations to go around subnumbering them 149-1, 149-2, 149-3 and so on, is that correct?

A. That is the way it appears here.

Q. And how many of those subnumbers did he have before he rejoined the 150?

A. 149-21, that makes 21 stations.

Q. Give me the cut in the bottom of the ditch at 149.20.

A. 5.4 feet.

Q. Start at Station 150 and give us that, Mr. Ringdahl, the cut in the bottom of the old channel.

A. I have given that as 4.9.

944 Q. Take 160 and go on ten stations at a time.

A. Station 160, 4.9 feet; Station 170, 5.0 feet; Station 180, 5.2 feet; Station 190, 5.3 feet; Station 200, 5.3 feet; Station 210, 5.5 feet; Station 220, 5.5 feet; Station 230, 5.5 feet; Station 240, 5.6 feet; Station 250, 5.5 feet; Station 260, 5.6 feet; Station 270, 5.5 feet; Station 280, 5.6 feet; Station 290, 5.6 feet; Station 300, 5.8 feet; Station 310, 5.7 feet; Station 320, 5.5 feet; Station 330, 5.5 feet; Station 340, 5.6 feet; Station 350, 5.7 feet; Station 360, 5.7 feet; Station 370, 5.8 feet; Station 380, 5.7 feet. According to field book #4 at Station 390 the cut is 5.9 feet; Station 400 the cut is 6.1 feet; Station 410, 6.2 feet; Station 420, 6.2 feet; Station 430, 6.3 feet; Station 440, 6.2 feet; Station 450, 6.1 feet; Station 460, 6.3 feet; Station 470, 6.3 feet; Station 480, 5.8 feet; Station 485, 5.9 feet.

Q. Does that bring us to the first cut-off?

A. These two books are a little bit conflicting on account of the changes that were made.

Mr. Bronson:

Q. What two books, field books #3 and 4?

A. Yes sir; they seem to go back to #3 again at the Heggen cut, and the Heggen cut in field book #3 appears to be at Station 471; in field book #4 it appears to be at Station 474, so it is a little conflicting. There isn't much difference, however.

Mr. Palmer:

Q. You say the Heggen cut-off was at Station what?

A. Station 471 in book #3 and in book #4 it's at Station 474, and I can explain the reason for that.

Q. All right.

A. When Mr. Ralph checked up along the river in the first
945 place, Mr. Willard when he followed him with the checkings could not find the stakes that Mr. Ralph put down in the river bank and the new checking, you see, did not correspond exactly with the old measurements and there is where the conflict comes in. Now, you want the cut at Station 474?

Q. I thought you gave clear to 485; you shouldn't have given then beyond 470?

A. No, I jumped that cut because the cut is in between.

Q. Then the Heggen cut-off begins at what station?

A. At Station 474, field book #4.

Q. That is the one you have been using last in giving these figures?

A. Yes, sir.

Q. To get the length from where the cut-off ditch ended would you subtract 132 stations from 474?

A. Yes, sir, but you have to add, you understand, the 21 stations.

Q. So that would give, as I figure it, a distance of 363 stations or 36,300 feet from where the cut-off ditch entered the old channel in the northeast quarter of Section 23, Township 128, Range 46 down to where the first cut-off begins in the southeast quarter of Section 7, Township 127, Range 46?

A. Yes, sir.

Q. And this cut-off in the last described tract of land we speak of as Heggen cut-off?

A. Yes, sir.

Q. That would be approximately seven miles, Mr. Ringdahl, between the two points I have mentioned?

A. Yes, sir.

Q. Was there any departure whatever in the ditch as actually constructed from the old river channel in that seven miles?

A. No, sir, not to my knowledge.

946 Q. Well, you were there when the work was done and checked it up?

A. Yes, sir.

Q. Was there in fact any departure from the old river channel?

A. No.

Q. You may begin with the Heggen cut-off and tell us the depth of the cut beginning at Station 474.

A. Station 474, according to field book #4, the cut is 13.2 feet.

Q. Take five stations beyond that.

A. If I do that you wouldn't have anything left.

Q. Give it right across there.

A. And the next station, which is 475, is 13.3 feet; third station is 13 feet, that ends the Heggen cut.

Mr. Bronson:

Q. What is the number of the last station?

A. 476.

Mr. Palmer:

Q. At 476 it leaves the cut-off and again follows the old channel?

A. Yes, sir.

Q. Give us the depth at the first station in the old channel after this Heggen cut-off?

A. Station 477, 5.7 feet.

Q. Now take station 480.

A. Station 480, 5.8 feet.

Q. Now take ten stations at a time.

A. Station 490, 5.9 feet; 500, 5.1 feet; Station 510, 5.3 feet; Station 520, 5.4 feet; Station 530, 5.1 feet; Station 540, 5.4 feet; Station 550, 5.6 feet; Station 560, 5.4 feet; Station 570, 5.5 feet.

Q. Can you give 580?

A. Station 580 is 5.7 feet.

947 Q. Station 590?

A. 5.8 feet.

Q. 600?

A. 600 is 4.8 feet.

Q. 610?

A. I haven't got that. Station 606 is the last, 4.8 feet, and there is a sheet or a letter I haven't got here.

Q. Then you say there was some change made, a correction being furnished you on a slip of paper or something?

A. Yes, sir.

Q. And that you haven't got?

A. I haven't got it but I know where those cut-offs are.

Q. What is the next station that you have then after these corrections were made?

A. I have Station 671.

Q. So there would be between 6 and 7,000 feet there that you haven't got the depth on?

A. I haven't got the record here. I am sure I have it home in some letter or something, I didn't take that along; it isn't in these books.

Q. During that distance did the ditch follow the channel of the old river or make a cut-off?

A. It made in that distance, I think it made three cut-offs.

Q. And in what land was the first one?
A. Southeast quarter of 13, Township 127, Range 47.
Q. That one in the southeast of 13, what land do you call that?
A. That is the Kenney land.
Q. We would call that then the Kenney cut-off.
A. Yes, sir.
Q. Which direction did that turn?
948 A. The river turned easterly and the cut-off was made on the north and south. I have the distance of that cut-off and the distance around the cut-off, township of West Lake Valley.
Q. That is the Kenney cut-off?
A. That is the Kenney cut-off. Then there is one in the southwest quarter of Section 13 which is called the O'Hair cut-off.
Q. Which way does the river turn there?
A. The river turns westerly.
Q. And you have the dimensions of that cut-off?
A. I have the distance; and then there is a cut-off also across this—it is on the northwest quarter of section 24, called the Murphy cut-off. Then there is also a cut-off on the north half of the northeast quarter of Section 23.
Q. What might that be called?
A. I would call that the L. A. Anderson cut-off. There is also another small cut-off in Section 23, a little further down.
Q. What quarter?
A. It is in the south half of the northeast quarter.
Q. What do you call that?
A. That is on the C. J. E. Anderson farm.
Q. And the next one?
A. There is another one on the C. J. E. Anderson farm.
Q. What is the C. J. E. Anderson farm?
A. He owns the south half of the northeast quarter of 23, and the southeast quarter of 23, Township 127, Range 47.
Q. You say there is another cut-off?
A. Then there is a cut-off practically on the line, the center line of Section 23, between the Schumacher farm and the C. J. E. Anderson farm.
Q. What is the description of the Schumacher farm?
A. The Schumacher farm is the southwest quarter of 23
949 and the southeast quarter of Section 22, Township 127, Range 47.
Q. Is that the last cut-off?
A. No, sir, there is another cut-off. There is also a cut-off on the southwest quarter of Section 23 called the Schumacher cut-off. Then there is a cut-off center of Section 27.
Q. What might you call that?
A. The Isaakson cut-off.
Q. Now, Mr. Ringdahl, give us the depth of cut beginning at Station 671 where you have the data.
A. These figures are given according to the sheets furnished by Mr. Willard, the acting state drainage engineer, marked #5. Station 671, he hasn't got the cuts here.

Q. Has he got the depth of cut where the ditch followed the channel of the old river?

A. No, he hasn't got that; he has the cuts across on bends.

Q. He has nothing but the depth of the cut-offs?

A. That is all.

Q. Well, that Station 671, what cut-off would that be about?

A. I couldn't give you that.

Q. Give us the datum line in 671, the bottom datum line.

A. 974.6.

Q. Give us the bottom datum line at 680.

A. Datum line is 974.3.

Q. Give us the datum line at each ten stations.

A. Station 690, datum line 973.9; Station 700, 973.6. Now, I have marked here the Schumacher cut in lead pencil; do you want the cuts at the Schumacher cut-off?

Q. Yes.

A. Station 700, 12.9 feet depth, datum line, 973.6; Station 701, cut 12.5 feet, datum line 973.6; Station 702, 12.2 feet, datum line 973.5; that is practically the Schumacher cut.

950 Q. Now, give us the next cut below that.

A. I gave you Station 710, datum line.

Q. What cut would that be?

A. That is no cut.

Q. You gave me station what?

A. Station 710, 973.3.

Q. Go ahead, ten stations more.

A. Here is Station 717, and I have that marked Schumacher cut #2. Those two cuts are on Schumacher land; the first one is the upper one and this one is the big one close to the bridge.

Q. Give me the datum line on that and the depth of the cut.

A. Depth of cut 11.1, datum line 973.2; Station 718, cut 14.3 feet, datum line 973.1; Station 719, cut 13.3, datum line 973.1; Section 720, cut 12.4, datum line 973.1; that is the end of Schumacher cut #2, which is close to the bridge as I understand it. Now you want every ten stations from there down?

Q. Yes, but when it is in a cut-off mention that fact.

A. Station 730 the datum line is 972.8, no cut at all; there is no cut for 800 feet there in the bottom of the river. Then at Station 736, datum line 972.7, there is a little cut of 5.5, it is straightening the main channel, it wasn't any cut through the high land but it was straightening the channel through one little bend, nipping off the corner. Station 737, 6.6; that is the two stations there that the river was kind of straightened a little.

Q. Datum line?

A. Datum line 972.7; Station 750, datum line 972.3; Station 760, 972.1. There are two stations with no cut; and at Station 761 to Station 766, one hundred cubic yards of excavation to each

951 station.

Q. Would that mean any substantial deepening of the channel?

A. No, sir.

Q. Hardly enough to speak of?

A. Mighty little. From Station 767 down to Station 772 no cut at all, the datum line at Station 772 is 971.8.

Q. Take the next ten stations?

A. Station 780, datum line 971.6, no excavation.

Q. Between those two was there any excavation, any substantial excavation?

A. No, some of them run no excavation, and seven stations run practically with one hundred cubic yards to every one hundred feet. Station 790, datum line 971.3; there is no excavation there for thirteen stations; from Station 780 to 792 there is no excavation. At Station 793 begins what we call the Isaakson cut. The cut there is 15.9 and datum line 971.3. Station 794, cut 16.1, datum line 971.3; Station 795, cut 16.9, datum line 971.2; Station 796, cut 16.8, datum line 971.2; Station 797, cut 15.5, datum line 971.2; Station 798, cut 15, datum line 971.2; Station 799, that is the last station, cut none, datum line 971.2.

Mr. Pinkney:

Q. Where are you?

A. At the end of the ditch, middle of Section 27.

(Defendant's Exhibit 2A is marked).

Mr. Palmer:

Q. Mr. Ringdahl, this Defendant's Exhibit 2 which I offered in evidence as part of the cross-examination of Mr. Ralph and to which I have appended a small blue-print which I will designate as Defendant's Exhibit 2A, as corrected here in red pencil, does that show the ditch substantially as it was constructed?

A. Well, with these changes in here?

952 Q. As indicated in the red pencil.

A. Yes, sir, but the stations indicated thereon are not according to the stations that I have given here, that is, in this lower end.

Q. That is, the stations given on this map are not correct as the ditch was constructed?

A. No.

Q. Why was that?

A. Changes were made by Mr. Willard that originally were not planned by Mr. Ralph. I might also state that this attached blueprint was made by Mr. Willard, the acting state engineer.

Q. Later, after the first ditch was planned?

A. Yes, sir.

Q. I wish you would give me the bottom datum line at the railroad bridge, the Milwaukee railroad bridge.

A. 978.2.

Mr. Bronson:

Q. What number of station?

A. Station in book #3, 541.

Mr. Palmer:

Q. What was the bottom datum line at the wagon bridge just below the railroad bridge?

A. The same datum line.

Q. Give us the bottom datum line for a few of the stations below that, say ten stations apart.

A. Station 545, 978.1; Station 550, 978; Station 555, 978; Station 559, 978; Station 565, 977.8; Station 570, 977.7; Station 575, 977.6; Station 580, 977.5; Station 585, 977.5; Station 590, 977.4; Station 595, 977.3; Station 600, 977.2. These datum lines are taken from field book #3.

Q. And then down to Station 672, which you say is the
953 first one you now have a record of, is what?

A. Is 974.5.

Q. From the end of this ditch in Section 27, Township 127, Range 47 up to where the first cut-off, east and west cut-off, joins it in the northeast quarter of Section 23, Township 128, Range 46, did you measure the original channel of the river?

A. No, sir, I have not; those stations there would indicate the distance.

Mr. Bronson: I move to strike that out as not responsive to the question.

Mr. Palmer:

Q. Did you measure the channel of the old river around each of those cut-offs?

A. Yes, sir.

Q. That is, I mean wherever the convolution of the old river was cut off by the ditch and shortened?

A. Yes, sir.

Q. And did you measure the distance of the ditch across each of those cut-offs?

A. Yes, sir.

Q. And did you thereby ascertain how much this ditch shortened the old channel of the river between the points that I first mentioned, that is, the end of the ditch and the junction of the east and west cut-off up in Section 23, Township 128, Range 46?

Mr. Bronson: Objected to as calling for a conclusion of the witness and not for the actual fact, no foundation laid, the witness not pretending to be an expert engineer.

A. Yes, sir.

Mr. Palmer:

Q. Mr. Ringdahl, did you ever study civil engineering?

A. I did, in Sweden.

954 Q. How long?

A. I took it in college for two years.

Q. Have you practiced it?
A. To a certain extent.
Q. To what extent?
A. I have surveyed tile setting and also private ditches.
Q. And has your work in that been fairly extensive?
A. No, not so very extensive, I have surveyed six or eight private ditches.
Q. Can you run levels?
A. Yes, sir, I have laid in about 18,000 feet of tile.
Q. And you are familiar with the instruments used by engineers and surveyors?
A. Yes, sir.
Q. And their use?
A. To a certain extent. I wouldn't claim I am an expert, you understand.
Q. What did you use in making those measurements?
A. I used surveyors' instruments; oh, these measurements here?
Q. Yes, those measurements you have mentioned.
A. I used a surveyors' steel tape.
Q. Who assisted you in the making of these measurements?
A. Mr. Andrew Gunderson, at Wheaton, Minnesota.
Q. When did you make these measurements?
A. On the 17th and the 19th day of September, this year.
Q. Did you make them correctly, accurately?
A. We made them as accurately as we could; we took, however, the inside of the loops.
Q. What do you mean by that, the inside of the loops?

Mr. Pinkney: The shorter line, he means.

A. Yes; we couldn't travel in the middle of the river,
955 neither could we get across the river in places.

Mr. Palmer:

Q. What did you find the total lengths of these loops in the old river channel?
A. The total length of these loops was 17,789 lineal feet.
Q. What did you ascertain to be the total lengths of the parts of the ditch where they cut off a convolution of that old river?
A. 3,533 feet.
Q. What is the difference between them?
A. 14,257 feet.
Q. And that would be how many miles?
A. A trifle less than three miles.
Q. Is that the only shortening, Mr. Ringdahl, of the channel of the old river in that entire distance from the junction of the first cut-off ditch with it?
A. Yes, sir.
Q. Down to its outlet?
A. Yes, sir.
Q. Mr. Ringdahl, this river from the junction of the first cut-off,

by which I mean the east and west cut-off about 2½ miles long that we have been *spoken* of as the cut-off ditch, down-stream, does it wind back and forth through the valley or is it comparatively straight?

A. It winds around considerable.

Q. And is there a flood plane, a low lying area along the sides of the river in that distance where the water frequently overflows out of the land?

A. Yes, sir.

Q. What has been the effect upon that flood plane of the construction of this ditch by reason of the throwing out of the material excavated from the channel?

956 A. In a high stage of flood these banks or excavations out of the old channel have materially dammed up the flood plane as it runs from one rim of the flood plane way out in towards the center of the flood plane and then back again and so on.

Q. To what part of that flood plane do these windings run across at different points?

A. Down in or about Section 7, Township 127, Range 46, it runs practically across the entire flood plane, winds around in there.

Q. How high are these spoil banks thrown out there above the level of the land?

A. About 4 or 5 feet high.

Q. Passing on up-stream, tell us about the next winding of the river?

A. It isn't so much winding up-stream there except in Sections 23 and 26, Township 128, Range 46, the river winds considerably in those sections there.

Q. And how much of the flood plane does it fill there?

A. I should say a good third.

Q. On which side?

A. It runs pretty well towards the center of the plane in there, a little towards the east.

Q. And in Section 23, how is it there, where the river turns westward?

A. I had reference to that at the same time. My answer covers also Section 23, both 26 and 23.

Q. You are familiar with the action of the river along that section extending, I will say, from where it is joined by this cut-off ditch on down-stream, say to the Milwaukee railway bridge?

957 A. Yes, sir.

Q. What can you say as to the overflow of the river in that stretch?

A. Now or——

Q. Well, we will say before the ditch was put in.

A. The river did overflow.

Q. How wide?

A. I have seen the river there about half a mile wide.

Q. At what seasons?

A. In the spring, mostly.

Q. Early in the spring at the time of the break-up?

A. Yes, sir.

Q. And on which side does it overflow, if it overflows any more to one side than the other?

A. On the westerly side.

Q. How wide is the flood plane on the westerly side, average?

A. In some places it is wider and other places it is narrower.

Q. What is the widest place?

A. Close to half a mile, from quarter to half a mile.

Q. And the narrowest?

A. I should say about forty rods, something like that. I never measured that, so I would not attempt to make any accurate estimate on that.

Q. How frequently have you seen the overflows there from the river, whether they are every spring or nearly every spring or only at intervals?

A. I have seen it *at* several times but it is hard to remember. There was an overflow there, I think, in 1907 and there was an overflow in 1915.

Q. What part of 1915, may I ask?

A. In the summer.

958 Q. In the summer of 1915?

A. Yes, sir; also in the spring, both in the spring and summer, and in the spring and summer of 1916. In the spring of 1916 was one of the worst floods that I have seen in the time I have been at Wheaton.

Q. Take the spring of 1916, how wide did the flood extend through that section?

A. As near as I can judge it must have been about up as wide as three-quarters of a mile.

Q. How deep?

A. You mean from the bank of the river or from the level prairie?

Q. Yes, on the prairie outside of the channel of the river or on the land, I would say.

A. I would say from 3½ feet up to nothing.

Q. What about the current, movement of it?

A. It has a swift current.

Q. Both in the channel and outside of it?

A. Yes, sir.

Q. Why do you say it was a swift current, was that demonstrated by anything in particular, Mr. Ringdahl?

A. Now it is the current on the water, you see, it is the flow of the water; of course, the current in the river itself is more so than on the outside, you understand.

Q. But this current on the outside, did you observe anything of its effect on the railroad grade after it reached the railroad?

A. Yes, sir, it washed out the railroad grade for a long distance.

Q. How far from the bridge?

A. Somewheres about 60 rods.

959 Q. What direction?

A. Northwesterly direction.

Q. Northwesterly of the bridge 60 rods you say it washed out the railroad grade?

A. Washed out the railroad grade and washed out the ties and the

ties were floating on top of the water across Mrs. Emma Effelson's field.

Q. Where?

A. In the southeast quarter of Section 12, Township 127, Range 47.

Q. Did it cut a channel through the railroad grade?

A. Yes, sir.

Q. Where did the water go after passing through its channel or cut under the railroad grade?

A. It went in a southwesterly direction and connected again with the original Mustinka river channel near the southeast corner of Section 14, Township 127, Range 47.

Q. Was there any rim or obstruction or ridge of land or anything to stop the flow of the water down in that direction?

A. Not that I have seen.

Q. Mr. Ringdahl, the Swedish church that has been spoken of here, where is that?

A. That is on the northeast corner of Section 23, Township 128, Range 46.

Q. And which direction is it from this cut-off ditch?

A. On the south side of the cut-off.

Q. And after the ditch has turned from its easterly and westerly course to the southwest?

A. Yes, sir.

Q. Do I understand you to say that this flood condition, the water standing out on the land, obtained clear from the railroad
960 grade to the church?

A. I didn't see any water at the church because I wasn't up there but I saw the water up as far as the north line of Section 26.

Q. Had you seen the water there before in somewhat similar situation?

A. Yes, sir, I had.

Q. How did the quantity of water and the length of time that it remained there in 1916 compare with other times that you have seen it there before this ditch was constructed?

A. It remained there longer during the year of 1916 than I had ever seen it before.

Q. And as to the quantity of it?

A. It was, I would say, a great deal more than I had seen there before.

Q. And in the summer of 1915 you say you saw water there?

A. Yes, it wasn't so much then.

Q. Had you ever seen it there before in the summer months?

A. I think that in the summer of 1907 I saw the river above its banks.

Q. And this summer flood of 1915, I will ask you to compare that as to quantity and the length of time it stayed on the land on this particular area with the time you had seen it there before.

A. During the year of 1915 I don't think I saw it at the crest when it was the highest. When I *was* it I think it was, oh, I would say, 4 or 500 feet wide.

Q. How long did it stay there?

A. It stayed there for 5 or 6 days somewhere.

Q. Was that a longer or shorter time than you had seen it there before in 1907?

A. About the same.

961 Q. Did you see the water there in the summer of 1916 on this particular area?

A. Yes, sir.

Q. What time in the summer?

A. The last part of June I saw the river high.

Q. And were those lands along the sides of it flooded?

A. To a certain extent they were but not as much as in the spring.

Q. How long did the water remain there?

A. Og, about 4 or 5 or 6 days.

Q. How did the quantity of water and the length of time that it remained compare with the summer flood you had seen there in 1907?

A. About the same length of time.

Q. Now, I meant to ask you, after this year, 1916, what change was made in this railroad grade constructions, if any, at this point 60 rods or so northwest of the railroad bridge?

A. A bridge was put in there, a long trestle bridge.

Q. In 1917, this last spring, did you see water there upon the locality I have described?

A. Yes, sir.

Q. Extending up to the Swedish church?

A. Yes, sir.

Q. From the railroad?

A. Yes sir.

Q. How wide a stream or space?

A. Well, I don't believe there was as much water there in 1917 as there was in 1916; compared somewhat with 1915.

Q. Summer flood?

A. Yes, sir.

Q. How long did it stay on there?

962 A. About 5 or 6 days is generally the run.

Q. Has there been any difference in the quan-ity of water and the length of time that it stayed on according to your observation in this flood plane that I have mentioned from the railroad track and somewhat below it up to the Swedish church since this Mustinka state ditch was put in?

A. My opinion is that it hasn't made any difference.

Mr. Bronson: I move to strike out the answer as not responsive to the question.

Mr. Palmer:

Q. That is, the ditch has made no difference either with the quantity of water or the length of time that it stayed on, is that your opinion?

A. Yes, sir.

Q. And the result of your observation?

A. Yes, sir; that is my candid opinion.

Q. In the spring of 1916, by which I mean the time of the early

spring flood which would be, I think, the last of March or first of April, as has been mentioned here, did you observe the conditions at the wagon bridge west of Wheaton mentioned by Professor Chandler in his testimony?

A. Yes, sir, I saw the conditions there.

Q. And did you see them there at the crest of the flood, the height of the flood?

A. I was there when the water was the highest, at the time that this railroad grade washed out and the ties were washed down into the river, and I walked across that grade then.

Q. And that was about what time, Mr. Ringdahl?

A. You got me, I couldn't say just what date it was. It was in the early part of the spring months, I couldn't give the date.

Q. But it was the spring flood, the time of the crest of the
963 spring flood?

A. Yes, sir.

Q. What were the conditions there, if any, as to ice?

A. There was a large quantity of ice that broke up from the bottom of the river so the bottom of the river was filled with ice and snow, and then when the water came and got under the ice it raised the ice in the center and broke it loose from the sides and washed it down the river, and some of these flood conditions were caused by the congestion of ice at certain points.

Q. Where, what points?

A. Wherever they happe-d to congest, you know, against bends in the river and bridges.

Q. Did you observe anything as to the condition below this wagon bridge or at this wagon bridge, congestion of the ice?

A. I didn't notice it at that time except that I saw that great quantities of ice were going down the river, that is, from the spring flood, and I saw the same conditions in 1917.

Q. There at the wagon bridge, it has been testified here by Professor Chandler that according to some information that he had the water was about 2 feet, I think, above the floor of the bridge; what is there to that, Mr. Ringdahl?

A. If I remember right, the water at the south end of the bridge was just washing over the top of the planks. On the middle of the bridge it lacked about an inch or two.

Q. Of what?

A. Of going over the top of the planks. At the north end of the bridge I remember distinctly the planks were up about two or three inches and the water washed over the grade on the north
964 side of the bridge.

Q. And was there any time the water was any higher than that?

A. I think that was as high as I ever saw it.

Q. And you think you saw it at the crest of the flood?

A. I know I did.

Q. At that time what was the condition of the bottom of the river as to ice at that point?

A. That was in 1916?

Q. Yes?

A. I think the river was free from ice at that time, in the bottom of the river.

Q. I am not speaking now of floating ice, Mr. Ringdahl; do you know whether there was ice in the bottom of the river at that time?

A. I couldn't say as to the year of 1916 but I can state as to the year of 1917; I saw that and watched it.

Q. What condition was there then?

A. As I stated before, that the ice in the river was 2½ up to 3 feet thick and froze down to the bottom of the channel and left a small opening in the center of the river, maybe 3, 4, 5 or 6 feet wide where what little water floated down through the channel under the ice. On both sides of that little channel the ice was froze down to the bottom of the river and when the spring flood came from above from the snow which melts quicker than the ice, the water flows on top of this ice and raises the water to a great height in the river and also outside of the channel because the capacity of the river is obstructed by all that ice and snow in the bottom of the channel.

Q. That was in 1917 that you observed that?

965 A. That was in 1917; I thought that was the year you referred to when I answered the first time.

Q. I was asking you about the year 1916 when they had the high water, the big flood.

A. I don't remember if there was any ice then, I couldn't state that; I think all the ice was gone then.

Q. Which year were you describing where you saw the water oozing over the planks of the bridge?

A. That was in 1916.

Q. And whether there was ice in the bottom of the river out there at the railroad bridge, you didn't observe particularly?

A. No, sir, I wouldn't say as to that. I paid particular notice to the congestion of the ice in the river in the Spring of 1917 as we had considerable trouble with our bridges and we had men stationed at our bridges with dynamite to blow the ice, and I visited every bridge.

Q. Now, this cut-off ditch where it cuts off the northerly bend of the river, going back to that, did you observe anything about what time that broke up so as to carry water in the spring of 1916?

A. I couldn't give the dates of that but I know that the cut-off ditch will never open up and let the water through there as quickly as around the bend.

Q. As the old river?

A. Take all the way from 5, 6 or 7 days.

Q. That is, the old channel around the bend will open up 5 or 6 or 7 days earlier.

A. Yes, sir.

Q. And why is that, Mr. Ringdahl?

A. It is a common fact that the snow and ice gathers in there and freezes ogether and, of course, the sun can't get in

966 as quickly as it can in the north and south and wider channel of the old river. Furthermore, the channel of the old river is straight and this here makes quite an angle.

Q. This cut-off?

A. Yes, sir, the old river bed is straight in a northwesterly direction while this makes an angle to the west.

Q. You mean this cut-off ditch is right at right angles with the channel of Twelve Mile Creek where it starts?

A. Yes, sir.

Q. Did you have anything to do, Mr. Ringdahl, with the obtaining of this appropriation for the construction of this last section of the Mustinka state ditch?

A. What do you mean?

Q. Did you have anything to do with the obtaining of the appropriation; were you instrumental, did you do some work in obtaining that appropriation?

A. I was with that committee down to St. Paul.

Q. That is to get the legislature to appropriate this money?

A. Yes, sir.

Q. To build this last section of the ditch?

A. Yes, sir.

Q. In a general way, Mr. Ringdahl, what was the purpose of the construction of this last section of the Mustinka state ditch?

A. As I understand it, before the construction of cleaning out of this Mustinka river the water spread out over a flood plane, as I would call it.

Q. What flood plane, where?

A. Along the Mustinka river?

Q. Where?

967 A. Northwesterly of Wheaton and towards the Swedish church in Section 23. We asked for the cleaning out of the Mustinka river so that the waters could be confined to the channel and not flood the lands on both sides as the water passes down into Lake Traverse. It wasn't asked for the purpose of draining any other lands outside of this particular area. That is the way I understand it, at least.

Q. That is, its purpose was to take the flood waters after their arrival at a point, we will say, marked by the beginning of this cut-off ditch at Twelve Mile Creek and confine them within the banks of a channel instead of permitting them to spread over the adjacent lands?

A. Yes, sir.

Q. Was there any purpose, according to your understanding, of draining down flood waters from a delta zone around the confluence of the old Mustinka river with the Twelve Mile Creek.

A. I never heard of it.

Q. And was there any accumulation of the water easterly of the Twelve Mile Creek except these Redpath sloughs as you have described them?

A. No, sir, except as hereinbefore stated that whenever we had a heavy rain it filled up the low pot-holes and depressions in the ground same as it always does in any country.

Q. This ditch wouldn't help that any?

A. No, sir.

Q. I want to ask you from your observation and knowledge of that country there before and after this ditch construction, whether this Mustinka state ditch was a success?

A. You mean the second section of it?

Q. Yes, that is all right?

A. I don't consider it a success.

968 Q. Why?

A. Because the bends originally planned for was not cut off, it wasn't straightened much, and also these waste banks are along the channel and rather filling or damming up the flood plane than to help it. I believe, however, that in a common stage of waterflow that the channel will handle a little more water than it did originally but in a flood it is rather a hindrance.

Q. And as I understand it, its purpose was to control the waters there in flood times?

A. Yes, sir.

Q. And so far as that purpose goes it has been a failure?

A. Yes, sir, that is my opinion.

Q. Does it carry, Mr. Ringdahl, in times of heavy rainfall any more water or any faster into Lake Traverse than the old river did?

A. You mean in a heavy flood?

Q. I mean in flood times, yes, sir.

A. I don't think it does on that account that I have stated.

Q. Well, have you observed whether the conditions of the water remaining on the land and the quantity and the length of time it remained have been the same since the construction of the ditch as it was before?

A. Yes, sir. The water has been just as high or higher and it has remained upon the lands just as long a time as I have seen it previous to the construction of this ditch.

Q. I take it that there have been a number of county and judicial ditches constructed into this Mustinka channel since it has been dredged out?

A. Quite a number of them.

Q. And a number of new ditches constructed into Twelve Mile creek and Five Mile creek?

969 A. Yes, sir.

Q. And those have been constructed as shown by Defendant's Exhibit 7 in all parts of this area tributary to this Mustinka river or watershed?

A. Yes, sir, Mustinka and Twelve Mile Creek.

Q. And Five Mile Creek? There have been a number as appears here from this map in Big Stone county around Tokah Lake?

A. I think there is, I haven't got much knowledge about those ditches.

Q. And some in Stevens county?

A. Yes, sir.

Q. And some in Grant county?

A. Yes, sir.

Q. And some in Wilkin county?
A. I don't think Wilkin county drains into the Mustinka.
Q. No, that drains into the Rabbit.
A. Yes, sir.
Q. Do you think the old river and Twelve Mile Creek and Five Mile Creek would carry the drainage from those ditches just as well without the construction of this last section of the Mustinka state ditch?
A. Yes, sir, the last section of the Mustinka state ditch has nothing to do with them at all.
Q. It doesn't improve the outlet to that drainage at all?
A. No, it does not because the elevation of the water is just as high now as it has ever been out there.
Q. These county ditches and judicial ditches, you know something of their cost, do you?
A. Yes, sir.
Q. And the laying out and constructing them?
A. Yes, sir.
970 Q. From your long service as one of the board of county commissioners?
A. Yes, sir.
Q. What would you say is approximately the cost of the construction of these various county and judicial ditches that have been put into this Mustinka river and its various tributaries?
A. Approximately a million dollars, that is, including tiles and tiling systems and all.
Q. There have been some private tiling systems put into these ditches?
A. Private and public.
Q. And have there been some private open ditches put into the public ditches?
A. Yes, sir, a number of them.
Q. And this expense of construction, say in your county, how has that been provided for?
A. By levying taxes, annual taxes against the lands benefited.
Q. And how has the county provided for the immediate payment of those?
A. Issued bonds upon the county.
Q. What is the purpose of these ditches?
A. The purpose of these ditches and drains, tile drains, is to carry off the excess water from the lands through which they pass.
Q. And are they all what may properly be termed agricultural lands?
A. All of it with the exception of, I would say, of those sections mentioned.
Q. In the sloughs?
A. In the sloughs.
971 Q. And those if they are dry are just as available for agricultural purposes as any of the other lands, I apprehend?
A. Yes, sir, I should judge so.
Q. And have these ditches resulted in the improvement of the agricultural lands that they drain?

A. They certainly have.
Q. And to an amount equal, at least, to the cost of them?
A. Yes and more too, many times more.
Q. Do you know the height attained by Lake Traverse in the time of this flood, 1916?
A. I don't know the elevation.
Q. You don't know the elevation?
A. Yes, connected with the height of the sea level, I don't know that.
Q. But did you record in some manner the extreme height which the waters attained, that Lake Traverse attained in the spring of 1916?
A. Yes sir, I did.
Q. How, Mr. Ringdahl?
A. I have a cottage on Lot 12 I think it is—on the eastern lake-shore of Lake Traverse about a mile south of where the Mustinka river enters the big lake.
Q. How did you record this flood?
A. At the high stage of water in the year 1916, about the 1st of July, the lake was very calm and still one evening and I thought the water was very high. So I went into the cottage and got a paint brush and some green paint and I drew a line on top of the water on a great big rock on the shore, on the eastern shore near my cottage. And it never went above the lower edge of that green paint line that I made on the rock.

Q. And had you ever seen the lake as high before as it
972 was at that time?

A. I never saw it as high as that.
Q. Did you observe how near to that height the lake attained in the spring of 1917?
A. I am not positive but I think about 28 inches.
Q. Lower?
A. I couldn't say, something like that, it may not have been that much.
Q. You mean you saw the height but you didn't measure it, is that what you mean?
A. I didn't measure it. I wouldn't state any measurement to that because I didn't—I measured it here the other day.
Q. You say you measured it the other day?
A. Yes, sir.
Q. Just recently?
A. Yes, sir.
Q. How near to that height did it attain?
A. It is 3 feet, 5 inches lower now than it was at that time.
Q. Has Lake Traverse been any higher, according to your observation—I am not asking you for your judgment as an expert engineer or any thing of that kind, just as layman—has Lake Traverse been any higher since this ditch has been constructed than it was before, taking the rainfall and other conditions into consideration?

Mr. Bronson: That is objected to as calling for an expert opinion.

A. In the summer of 1916 the lake was high, it has been high at various times before. In 1907 and 1908 the lake was very high, especially in 1907. That is the year when I built my cottage on the lake shore and it was very high there.

Q. How did it compare with 1916?

973 A. 1916 it was higher than I ever saw it before.

Q. You have observed the lake considerable, have you, Lake Traverse?

A. I have because I have spent two or three months there in the summer time and then in the fall I have been hunting a good deal there.

Q. Fishing?

A. Fishing and hunting.

Q. How has it been this summer compared with previous dry years?

A. It is higher water, the lake is higher now than it has been in the dry years before.

Q. What dry years do you think of before?

A. I think 1910 was a dry year, if I remember right. It is very hard to remember dates away back like that. I wouldn't attempt to give any dates but we have had several dry seasons.

Q. I suppose that for a year like 1916 you naturally expect it to be higher than for previous dry years?

Mr. Bronson: Objected to as leading and calling for a conclusion of the witness, calling for an expert opinion not based upon any hypothetical question submitted to the witness.

A. Yes.

Cross-examination.

By Mr. Bronson:

Q. I believe you stated in your direct examination, Mr. Ringdahl, you have been a resident either of Norcross or Wheaton, Minnesota, for a period of 24 years past?

A. Yes, sir.

974 Q. In connection with your testimony you mentioned your familiarity with this section known and described in the evidence as the Delta zone by reason of having met your wife there. When did you meet her, how long ago?

A. In the spring of 1894.

Q. And when were you married, if I may ask?

A. On the 24th day of February, 1895.

Q. So far all practical purposes you have been quite familiar with these lands in the Delta zone from the spring of 1894 down to the present time?

A. Yes or some in the fall of 1893.

Q. And in the years 1894 and 1895 doubtless you went over some portion of these Delta lands quite frequently?

A. Yes, sir.

Q. And by reason of your residence and knowledge and familiarity you are acquainted with the season conditions?
A. Yes, sir.
Q. Climatic conditions that existed there for all these years as affecting the Delta zone as well as the other lands in Traverse county?
A. Yes, sir.
Q. As you stated you have a knowledge you think better than that of any other land man living concerning these lands?
A. I think so, yes, sir; that is, regarding detailed conditions.
Q. That would include general conditions?
A. Yes, sir, that would include general conditions.
Q. You have observed the floods that had existed during this period of years on the watercourses in Traverse county?
A. I have, yes, sir.
Q. You have observed during those years the flood condi-
975 tions that existed along the Mustinka river?
A. Yes, sir.
Q. And that have existed along Twelve Mile Creek?
A. Yes, sir.
Q. And that have existed along Five Mile Creek?
A. Yes, sir.
Q. And to some extent along Rabbit river?
A. No, I wouldn't say so.
Q. You have seen the Rabbit river?
A. I have.
Q. When did you first see it?
A. I think it was in 1908.
Q. And where did you see it?
A. I saw it northwest of Tintah.
Q. And you spoke of being agent of the Union Central Life Insurance Company?
A. Yes, sir.
Q. Covering what territory?
A. Covering all of Traverse county, a portion of Grant county, also the western portion of Stevens county.
Q. How long have you been such agent?
A. I think that I made the first loans for the Union Central in 1899 or 1900, I couldn't say for sure.
Q. You have been here, Mr. Ringdahl, all during these hearings before Commissioner Douglas?
A. Yes, sir.
Q. From September 12th up to the present time?
A. Yes, sir.
Q. Are you in the employ of the State of Minnesota?
A. I suppose that they will pay me for it.
Q. You didn't come down here voluntarily, did you?
976 A. No, they promised to pay me, asked me to come.

Mr. Palmer:

Q. Who did?
A. Mr. Palmer.

Mr. Bronson:

Q. Assistant attorney general of the State of Minnesota?
A. Yes, sir.
Q. You mention in your testimony about being down here with a committee at the session of the legislature I presume for the year 1915?
A. I think it was in 1911.
Q. Your testimony on direct with reference to being down here with a committee concerning this state ditch was in the year 1911?
A. I tell you I shall not answer that question before I can look up the dates. We were down here first and the bill was passed through the legislature and Governor Johnson vetoed it; it was again passed the second time and we were not down here then. We were down here the first time, but what year that was—somewheres along in about 1909 or 1910.
Q. You think you were down here then with this committee that you mentioned in your direct examination in the year 1909 or 1910?
A. Yes, sir.
Q. For the purpose of getting an appropriation for this last ditch?
A. Yes, sir.
Q. Were you down at the legislature to get any appropriation for the completion of this last ditch?
A. No, sir.
Q. Did you attend any session of the legislature between the years 1909 and 1910 up to the present time?
A. No, sir.
977 Q. Did you attend or were you present at any session of the legislature up to the year 1909?
A. No, I have only been here once.
Q. Just once?
A. Just once.
Q. In the year 1895 you were operating an elevator at Noreross?
A. Yes, sir, commenced 1893 in August.
Q. There in the year 1894?
A. Yes, sir.
Q. And 1895?
A. Yes, sir.
Q. And 1896?
A. Yes, sir.
Q. 1897?
A. Yes, sir.
Q. 1898?
A. Yes, sir.
Q. 1899.
A. Yes, sir.
Q. How much longer?
A. I left there the 10th day of June, 1901, but the last few months I didn't operate the elevator; my brother was operating it then, I turned it over to him.

Q. Your time of operating the elevator at Norcross extended from the fall of 1893 up to 1900?

A. Yes, sir, up to 1900.

Q. What territory was tributary to Norcross in 1893 and 1894 and 1895?

A. Up to 1901, I think, extended up to 1901, not to 1900.

Q. What territory was tributary to that elevator?

978 A. The lands on the west side, including townships of Gorton, part of Logan, Redpath, Clifton and part of Tintah and southern portion of North Ottawa, and western portion of Delaware townships.

Q. Have you stated all now?

A. I think that was all. I received some grain from the township of Monsen, also from the township of Lake Valley, Eastern Lake Valley.

Q. Were there two elevators in Norcross there in those years?

A. Yes, sir.

Q. All during those years?

A. Yes, sir.

Q. And how big was the town in 1894 and 1895?

A. It was only a small town.

Q. One hundred people?

A. Just about, including all of them.

Q. And was the town of Charlesville there then?

A. No, sir, Charlesville, the elevator at Charlesville was erected later than that.

Q. When?

A. I couldn't give the date of that.

Q. After you quit the elevator business?

A. About that time, I think.

Q. And Tintah was a town then?

A. Yes, sir.

Q. Had two elevators then?

A. I think Tintah had two or three elevators. The town of Hereford was in there.

Q. In what?

A. Just north of Norcross ten miles.

Q. Herman was southeast of it?

979 A. Southeast five miles.

Q. How big was Tintah then?

A. About 3 or 400.

Q. And Herman?

A. Herman about 500.

Q. You spoke of handling 148,000 bushels of grain in the fall of 1895?

A. Yes, sir.

Q. What kind of grain?

A. It was wheat, oats, barley and flax.

Q. How do you know that you handle 148,000 bushels of grain?

A. Because I added it up.

Q. When?

A. At the end of the season, it was about 148,000, I couldn't state just—I think it was a little over.

Q. How much did you handle the year 1894?

A. I didn't handle that much.

Q. How much?

A. In the year of 1893 and 1894——

Q. I want 1894 first.

A. You can't get that because the two years go together from August 1st to August 1st.

Q. If I understand your testimony on direct examination you said that in the year 1895 your elevator at Norcross handled 148,000 bushels of grain?

A. That is from the 1895 crop, that would be in 1895 and 1896, you understand.

Q. Between what dates?

A. I think we had our cut-offs about the 25th day of July.

Q. You mean to say then in your testimony that when you stated you had 148,000 bushels of grain, handled that in the year
980 1895, that those were your receipts of grain from July 25, 1895 to July 25, 1896?

A. Yes, sir, but that means the 1895 crop, we term it that way.

Q. I am asking you how much you handled in your elevator for the 1894 crop.

A. From the time I came there on the 3rd day of August, 1893——

Q. No, that isn't the question, Mr. Ringdahl, if you will pardon me, because you couldn't handle the 1894 crop in the year 1893.

A. No, that is right. Somewheres about 45,000 bushels, I think. I can't give those figures off-hand because I have no record here of it.

Q. Why couldn't you give them as correctly as you did for the year 1895?

A. No because that was such an exceedingly good crop and I thought I handled so much grain that I always kept that fresh in my mind. I didn't handle anything near like it up to that time nor like it at any time after that time; that was the big crop year.

Q. It was the big crop year all over that country?

A. Yes, sir.

Q. Not only in your territory but as well to the west, north and south?

A. Yes, sir.

Q. It was a banner year for the Red river valley in history wasn't it?

A. A good year all over.

Q. Isn't it the banner year?

A. Yes, sir.

Q. Nothing like it before or since, isn't that correct?

A. I don't believe I ever saw anything like it and I don't
981 think I will see anything like it again.

Q. What was the amount of grain that you handled for the crop year 1896 in that elevator?

A. I think that 72,000 bushels was the very most that I handled

any year outside of that year that I took in the 1895 crop. I remember I handled 68,000 bushels one year and 24,000 bushels one year.

Q. What year 24,000?

A. The first year.

Q. 1893?

A. 1893 up to July 25th.

Q. And for the balance of the years you haven't any particular recollection?

A. No, I have not. I remember I got 24,000 one year and 46 some thousand one year and 68,000 one year but then that 148,000, I remember that.

Q. Now, you say that in that year, 1895, 68 per cent of this grain came from the delta zone; state how you computed that.

A. I figured on that two-thirds, which would make it 66.6, that two-thirds would come from west of Norcross and southwest compared with the grain that would come from the north and from the east, owing to the fact that the railroad stations were a good deal closer.

Q. Well, how did you get the other 1.4 per cent?

A. I figured on two-thirds; I guess I made a mistake on that 68.

Q. You didn't mean to say you had any absolute calculation which made it 68 per cent even?

A. No, I mean to say two-thirds and one-third.

Q. In other words, this 68 per cent that you stated was a
982 mere estimate?

A. It was a mere estimate, yes, sir. I meant to say two-thirds compared with one-third; that makes 66.6.

Q. How much percentage of the grain, also by way of estimate, did you handle as compared with the other elevator in that town?

A. I always got a little more than my share.

Q. In the proportion of 55 to 45, would you say?

A. Yes, sir, I think I got about 60 per cent of the grain when the other man got about 40. That is a rough estimate because I would have no way of telling how much the other man would get except what I saw going in there to that elevator.

Q. And did the other elevator also have as tributary to it the same territory you mentioned?

A. Same territory.

Q. And you spoke of one-third of it coming from east of Norcross, would that come out of this territory that you have described as being east of Norcross?

A. Yes, sir, east and north.

Q. So that as I understand it, generally speaking, the elevators at Norcross would handle the grain which was tributary to the territory that you have mentioned?

A. Yes, sir.

Q. And did so in the year 1895?

A. May I add that we received really more than the grain from our territory. We received considerable grain from the west side of the Twelve Mile creek in what we called the Swedish settlement.

They came to Norcross and bought their fuel; we sold wood there at considerably less than they sold it at Wheaton, Minnesota, and so they brought in grain and brought wood with them back
983 home.

Q. So that in making your estimate of two-thirds west of Norcross and one-third east of Norcross it would include some territory outside of this delta zone?

A. Yes, sir, it would. It would take in some outside of it.

Q. Not any great amount but some?

A. Yes, sir, it would.

Q. Maybe 10 per cent?

A. Yes, sir, at least that. Of course, you understand, that we didn't get all the grains from the delta zone. Wheaton and Herman and Dumont would get some.

Q. Because you haven't described as tributary to Norcross all the territory in the delta zone?

A. No, sir.

Q. But generally speaking you handled, Norcross would handle the grain from Redpath and Clifton?

A. Not all from Clifton.

Q. But from Redpath?

A. From Redpath and I would say the north half of Clifton, not even all of that, but occasionally they would come in as I say and bought wood.

Q. In the year 1895 you speak of the crop yields as averaging from 25 to 30 or 35 bushels per acre?

A. Yes, sir.

Q. That I presume would mean a general average of about 27½?

A. I think the average was very near 25 bushels to the acre.

Q. In the delta zone?

A. Yes, sir, and all over, for that matter.

Q. Do I take it that your testimony is that in Traverse county in the year 1895 the general average yield of wheat was 25
984 bushels per acre?

A. I kind of think it was but you understand that at that time I didn't have the knowledge of Traverse county, the western portion and the southern portion of it and northern portion as I have today. I don't know, I couldn't——

Q. So that, in stating your yields of the crop year of 1895 it would be based upon the crop yields of territory that was tributary to your elevator?

A. Yes, sir, certainly.

Q. You don't pretend to have any particular knowledge of what the yields per acre up in Taylor township were?

A. No, sir.

Q. Or what they were down in Parnell township?

A. No, sir.

Q. Or what they were in the Bois de Sioux valley in 1895?

A. No, sir.

Q. Or what I have called in the evidence also as the Red river valley?

A. I didn't know anything about the yields except generally I saw they had good yields.

Q. Generally you understood it was a good crop yield?

A. Yes, sir, and the movement of the wheat on the railroad east.

Q. Now, in the spring, or rather year, of 1895, have you any particular knowledge of the crop yields in Ottawa township?

A. Yes, sir, the southern portion of North Ottawa hauled their wheat to Norcross.

Q. Have a good yield?

A. Yes, sir.

Q. And likewise Gorton township?

A. Yes, sir.

985 Q. Gorton township was traversed by this Mustinka river?

A. Yes, sir.

Q. And did Gorton township have as good crop yields as this delta zone territory?

A. I think it was about the same.

Q. And did Delaware township likewise have the same crop yields?

A. Yes, sir. Delaware township is a good township with the exception of some considerable sloughs in it.

Q. The Mustinka river runs through that township?

A. Yes, sir.

Q. Were you acquainted with Lien township that year?

A. I think I was down in Lien township but I wouldn't pretend to know much about it.

Q. You don't have any recollection of the crop yields that year?

A. No, sir.

Q. Do you think you received any grain from there?

A. I think I received once in a while a load of grain but not anything to speak of.

Q. You became county commissioner first in what year?

A. I think I took office on the first Monday in January, 1907.

Q. When you came there in the fall of 1893 were there any ditches constructed in this delta zone or in Traverse county?

A. No, sir. not that I know of.

Q. These ditch constructions that are shown then on this Defendan't Exhibit 7 along the Mustinka river, state, county and judicial, have all taken place then since the year 1893?

A. Since 1893, yes, sir.

Q. That includes, doesn't it, all these ditch constructions we have been talking about, both in this delta zone as well as in the surrounding territory, such as Tintah on the north, such as

986 Taylor township, such as Monsen township, such as Lake Valley township?

A. I think it does.

Q. All of it is within your district?

A. No.

Q. Within your county?

A. Within my county, with the exception of those in Wilkin county and Grant county.

Q. How many county commissioners have you?
A. Five.
Q. You have become, during your period of residence there and before this ditch construction, familiar with the watercourses in this delta zone, what we term as the moraine zone?
A. Yes, sir.
Q. You were familiar with the fact that the Mustinka river rises in this moraine zone, flowing in a general north and south direction through the moraine zone?
A. Yes, sir.
Q. And then westward through the township of Delaware and Gorton through this so-termed delta zone?
A. Yes, sir.
Q. And you were familiar with this so-termed Five Mile Creek and the Twelve Mile Creek?
A. Yes, sir.
Q. Which emptied into the Mustinka river?
A. Yes, sir.
Q. And in a general way you were familiar with the Mustinka river as it existed in a state of nature flowing down towards Lake Traverse?
A. I saw it a few times previous to that.
Q. And you had occasion to traverse the territory between
987 Norcross and where your wife lived?
A. Yes, sir.
Q. Which meant traversing a portion of this so-termed delta zone?
A. Yes, sir.
Q. And crossing Twelve Mile creek and Five Mile creek and the Mustinka river?
A. Yes, sir.
Q. In a state of nature, Mr. Ringdahl, the Five Mile creek came from a southerly direction down in Stevens county, didn't it, and flowed in a northerly direction?
A. Yes, sir.
Q. And in a state of nature from time to time you observed this river?
A. I saw it several times.
Q. And as you observed it from time to time you could see whether or not it had a fairly defined bank and channel?
A. Yes, sir.
Q. And you could see it carrying the water from the south?
A. Yes, sir.
Q. Northward?
A. Yes, sir.
Q. Emptying it into the Mustinka river?
A. Yes, sir.
Q. And if I understand you correctly, this river or creek as we might term it, so named on the map, did carry these waters from the south in Stevens county as shown on this Exhibit 7 as far as a portion of the territory of Traverse?
A. It did.
Q. Northward within its banks?

A. It did.

988 Q. And emptied the same into the Mustinka river?

A. Into the Mustinka river.

Q. And it carried those waters in the Five Mile creek at the break-up of the spring and the melting of the winter snows within its channels?

A. It spread out, as I have stated, north of Section 34; it did spread over a part of Section 28 and part of Section 21 and part of Section 20.

Q. That is, in Redpath township?

A. That is in Redpath township, up to its outlet.

Q. Up to its outlet?

A. Yes, sir.

Q. Will you indicate on the map here the southern point where you ever saw the Five Mile creek overflow, most southern point where you saw it overflow?

A. (Indicating.) I never saw it overflow——

Q. The southern point, as I understand it, is the bottom line of Section 27 in Redpath township?

A. The south line of Section 27.

Q. In Redpath township?

A. Yes, sir, it may have been a little south of this bridge there but not very much because the banks are pretty well defined southerly there but in a northwesterly direction they are lower and spread out—or shallower.

Q. Then as I understand your testimony the Five Mile creek in a state of nature would carry all the waters and at any season of the year within its banks off and from the territory that was tributary to it up until approximately the south line of Section 27?

A. I should say so because there isn't a great deal of water
989 coming into the Five Mile creek. Five Mile Creek is a small water channel.

Q. A small water channel?

A. Yes, sir; I don't mean that the channel itself is small but the supply is not very great.

Q. That depends upon the rainfall?

A. That depends upon the rainfall, yes, sir, it does.

Q. There might be occasion in the spring when in excessive rainfall the river might overflow some place?

A. Yes, sir, and I also want to say from my observations that the bank of the Five Mile creek on the west side is somewhat higher than it is on the east side and the slope is from the east, and if there is any flood or spreading out of the water it is on the east side, not on the west side. That is just my judgment.

Q. You have observed it, you say, overflowing from the south line of Section 27 up to where it flows into the Mustinka river?

A. I have seen it overflow some in there.

Q. Now, the Twelve Mile creek, have you examined Twelve Mile creek from the place where it flows into the Mustinka down to its source?

A. I am very well familiar with the conditions of the Twelve Mile creek from the south line of Clifton township.

Q. South line of Clifton township further south?
A. Yes, sir; I would say more so from that point than from this point (indicating).
Q. More from Section 30 in Clifton township north?
A. Yes, sir.
Q. Than you are south?
A. Yes, sir.

990 Q. As comparing the two streams, the Twelve Mile creek has a better or lesser defined channel than Five Mile creek?
A. The Twelve Mile creek has the best channel, the highest banks of the three.

Q. The Twelve Mile creek is sometimes termed the southern branch of the Mustinka?
A. I have never heard that; I haven't heard any other name of it but Twelve Mile creek.
Q. I thought you said——
A. We have the east branch of the Twelve Mile creek and that is the west branch of the creek (indicating), so we say the east fork of the Twelve Mile creek and the west fork of the Twelve Mile creek.

(At this time recess is taken until 10 o'clock A. M., September 28, 1917.)

September 28, 1917, at 10 o'clock a. m.

WILLIAM RINGDAHL being recalled for further cross examination, testified as follows.

Examined by Mr. Bronson:

Q. I believe you stated in your direct extmination that you have seen Twelve Mile creek overflowed only north of Section 18?
A. Yes, sir.

991 Q. Now, the east branch of the Mustinka river that rises in what we call the moraine zone and flows south through the moraine zone and then westward into this delta zone, and this Five Mile creek which starts down in Stevens county and flows north through this so-termed delta zone, and this Twelve Mile creek which also starts apparently down south and flows northerly through or at the edge of this delta zone, all as shown by Complainant's Exhibit 1 and this Defendant's Exhibit 7, all have point of confluence, if I may use the term of confluence, in this delta zone in a state of nature approximately within a mile of each other?
A. They connect at the northwest portion of Section 7, that is, a state of nature.
Q. My question was directed, Mr. Ringdahl, you have in part answered it, I asked you whether or not in a state of nature the points of confluence, using that term relatively where the different streams flow in each other, are not approximately within a mile of each other?
A. Yes, sir, for a distance.
Q. The Twelve Mile creek flowed into the Mustinka river and the Five Mile creek flowed into the Mustinka river?

A. Yes.

Q. And the points where they flowed into the Mustinka river were within approximately a mile of each other in this delta zone?

A. Yes, sir; I think I understand your question.

Mr. Palmer: I would ask counsel whether there is any question but what the points of confluence are correctly shown upon the map, Defendant's Exhibit 7?

Mr. Bronson:

Q. The lands in this so-termed delta zone, generally speaking, are prairie lands?

A. Yes, sir.

992 Q. Not hilly?

A. No, sir, it is level.

Q. And without trees except such as have been put there on so-termed tree claims?

A. Yes, sir.

Q. The general slope of this delta zone, as has been designated in this Exhibit 1 and which you have referred to in your testimony as the delta zone, is north and northwest?

A. North and northwest.

Q. There isn't any question, generally speaking, is there, Mr. Ringdahl, that the drainage waters such as they were either from the moraine zone in the upper Mustinka or from the Five Mile creek in its lower branches or from the Twelve Mile creek in its lower branches in a state of nature went downwards in the courses of these streams and over and through in these streams this delta zone?

A. They did.

Q. During the years that you have lived in this community you have observed different years more or less surface waters on this delta zone as well as on other lands in that vicinity?

A. I have in time of floods.

Q. And when you speak of floods you mean times of unusual or inordinate rainfall or in break-ups in the spring?

A. In break-ups in the spring and also extraordinary heavy rainfalls. When answering your first question there I meant in ordinary rainfalls, I didn't mean in times of heavy floods.

Q. Have you a recollection of the years of 1905 and 1908 and 1912, with reference to whether they were wet or dry years?

993 A. 1907 I remember we had a wet year and I believe that we had a wet season in 1905. Those things are hard to remember without——

Q. You remember particularly about the year 1907?

A. I remember that, yes, sir, because that was an extraordinary year.

Q. You mean the winter of 1896 and spring of 1897?

A. Yes, sir, there was a heavy snow that winter.

Q. And that year you were living at Norcross?

A. I did.

Q. And in the spring of that year you saw much surface waters?
A. Yes, sir.
Q. All over this territory, the delta zone, as well as in territory around Norcross?
A. The portion of the delta zone that I saw this water in was northwest of Norcross, along the Mustinka river. I didn't see it at any other point.
Q. Was there considerable flood waters in the early spring of 1897 north of Norcross and northwest of Norcross?
A. Northwest of Norcross along the railroad track, along the public highway.
Q. And that extended westerly?
A. I suppose it did, I didn't see much of it west of the railroad track.
Q. Do you remember the month that this happened, in 1897?
A. I think it was the latter part of March.
Q. And the first week in April?
A. Yes, sir, somewheres in there.
Q. And were you down on the Five Mile creek that spring in the latter part of March and first week in April?
A. Not that I remember.
Q. Or on the Twelve Mile creek last week in March or
994 first week in April?
A. I came over the Twelve Mile creek but the crest of the water had not reached the Twelve Mile creek when I was there, but it met me when I came northwest of Norcross, there the crest of the water met me. So I didn't see the crest of the water in the Twelve Mile creek that spring.
Q. You haven't kept any personal records of rainfall or anything of that sort from which you have testified?
A. No, sir, I have not.
Q. Your testimony concerning wet or dry years is that of recollection, isn't it, as you remember it?
A. Yes, sir; I remember distinctly of the spring of 1897.
Q. You remember of the year 1896 as to whether you had considerable rainfall that year?
A. I think we had considerable rainfall that year in 1896.
Q. And were many of these lands wet that summer particularly in the months of May or June?
A. I can't remember. I don't think I saw any extraordinary moisture or water on the lands in that zone, I don't believe I did.
Q. You wouldn't say that some of those lands were not overflowed in the delta zone in May and June, 1896?
A. At least, I didn't see it.
Q. You haven't any distinct recollection about 1896 at this time?
A. I have not.
Q. Have you any about the year 1905?
A. I think that 1905 had considerable rainfall and I think I saw the Mustinka river rather high north of Wheaton, I think I did, in that year.

Q. What were the crop conditions in 1905 as you recollect it, with reference to whether or not it was wet in the fall and your ability to gather the grain, harvest it and thresh it?

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A. There was one year in the fall, maybe that was in 1905, when a lot of grain wasn't cut on account of heavy rains, I couldn't say about the year, though.

Q. That applied to the delta zone as well as some other lands in that vicinity?

A. I think it did but I couldn't swear to it whether it was in 1905. There was one year I remember some of the farmers could not cut their grain.

Q. Was that to any extent extensive?

A. No, it was not, because they were using the small engines on the binders and operated the binders by the engines.

Q. That is, there were some farms where it was impossible to cut the grain that year?

A. Now, I couldn't say. I don't recollect, I don't think it was very extensive, it may have been small pieces here and there that wasn't cut.

Q. But you have a recollection of that one year farmers using light engines to cut the grain?

A. Yes, sir, I know that they were using engines. They were buying engines at Wheaton to bring out and they attached them to the hind portion of the binder.

Mr. Palmer:

Q. And let the engine do the cutting while the horses pulled?

A. Yes, sir, because the bull wheel would slip.

Mr. Bronson:

Q. On account of the land being wet?

A. Yes, sir.

Q. In the year 1914, in the fall, you say, they had in this Delta zone a two-thirds crop?

A. As near as I can recollect, at least I got a two-thirds crop on my land and the rest of them got in the same proportion.

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Q. You say that likewise in the fall they only got two-thirds of a crop in Taylor township?

A. I think the entire Traverse county had about two-thirds of a crop with the exception of the higher lands on the east side of Traverse Lake.

Q. Like those in Arthur township, you mean?

A. Like Arthur, Walls, Windsor and Folsom, West Lake Valley and West Monsen, they had a little more than the rest of them.

Q. I believe you stated that you owned the southwest quarter of Section 10 in Redpath township?

A. I owned it for about a year.

Q. In the year 1898?

A. I think I bought it in the year 1898.

Q. Was that this Ole Bronander land?
A. Yes, sir.
Q. What did you pay for it?
A. I paid $2,000 for it.
Q. For the quarter section?
A. Yes, sir.
Q. What was it worth in 1896, same amount?
A. About the same.
Q. What is it worth, its market value now?
A. About $45 an acre.
Q. Did this land need any ditching, this southwest of 10?
A. I think it did.
Q. You speak also of having owned the southeast quarter of Section 30 in Redpath township?
A. Yes, sir.
997 Q. You owned that about a year?
A. Southeast of 30?
Q. Yes.
A. No, I have owned that about seven years.
Q. You owned that about seven years?
A. Yes, sir.
Q. When did you first get that?
A. About 7 or 8 years ago.
Q. And you own it yet?
A. I think it was about 1910.
Q. And you own it yet?
A. Yes, sir.
Q. What did you pay for it?
A. I paid $40 an acre.
Q. In 1910?
A. Yes, sir.
Q. What is its value now?
A. About $60 an acre.
Q. I am talking about market value, you understand, market value?
A. Yes, sir.
Q. Did this land need any ditching?
A. Yes, sir, I have put in 8,000 feet of tile there and a ditch on the north side and this ditch on the south side and the river is on the east side of it. I think all those level lands need either tiling or open ditches to take off the excess waters that the ground can't absorb.
Q. I believe you also stated that you own the southeast quarter of 24, East Lake Valley?
A. Yes, sir.
998 Q. How long have you owned that?
A. About a year.
Q. When did you get that?
A. I got that in 1916.
Q. That is just outside of the so-termed delta zone isn't it?
A. It is a mile west from the Twelve Mile creek.

Q. And isn't within this blue shaded portion we have mentioned?
A. No, sir, it is not.
Q. When did you sell that land?
A. I didn't sell it. I still own it.
Q. What is that land worth now, market value?
A. About $50 an acre. Of course, I have put on a lot of improvements since I bought it. I think I paid $42 an acre for it.
Q. I believe you stated you also owned the southeast quarter of Section 15 in Clifton township?
A. Yes, sir.
Q. You bought in 1903?
A. About 1903, yes, sir.
Q. In the so-termed delta zone?
A. Yes, sir.
Q. And got it yet?
A. Yes, sir, I have had it all this time.
Q. And what did you pay for that?
A. I bought the north 80 in 1903 and I paid $29.25, if I remember right, for the north 80, and the south 80 I bought 3 or 4 years afterwards and paid $32.75 an acre for it.
Q. What is the market value of that land now?
A. About $60 an acre.

Q. This land needs ditching like the others as you have
999 stated?

A. Yes, sir; I also put over 9,000 feet of tile on that quarter-ditch on the south side and ditch on the east side.

Q. Now, Mr. Ringdahl, you read off a compilation of settlers or farmers on the lands in the so-termed delta zone in the year 1896; when did you make that compilation?
A. Yes, or prior.
Q. Or prior?
A. Yes, sir.
Q. When did you make that compilation?
A. I have made it since I came down here.
Q. And how did you make it?
A. I took the tax books for 1896 and compared them with my memory because I knew practically all those people in there, but I understand now that I have left out quite a number of them. I didn't give them all, but those were the names and the parties that I actually saw and knew that I gave here.
Q. Do I understand from your testimony that in the year 1896 each one of these parties whom you have named in Redpath township and Clifton township owned or resided on this land?
A. That is according to the best of my recollection. I may be at error as to some of the descriptions of those lands, I wouldn't swear to that every one of them is correct in every particular nor would I swear to that the estimated number of acres under cultivation are exactly correct; you understand it is only an estimate.
Q. May it be that in this compilation of resident farmers that you have named some of them may have been there before 1896 and not there in the year 1896?

A. I think that most of them that I gave were there in either 1895 or 1896.

1000 Q. My question was, whether or not in the compilation of farmers, some of them might have been there prior to the year 1896, a few, and not have been there in the year 1896?

A. It might have, yes, sir.

Q. In other words, at this time, going back twenty odd years, you have made a compilation of farmers as you best could recollect it?

A. That is what I did.

Q. And you made it as inclusive as you could recollect it?

A. Yes, sir, I did.

Q. You may have made errors in putting in some farmers that might not have been there actually in 1896 and you may have made errors in not enumerating some fellows you might have overlooked in 1896 or missed or omitted?

A. It ain't very many—it might be some.

Q. It might be some?

A. It might be some that was there in 1895 that wasn't there in 1896, but I am pretty near positive they were there in either of those two years.

Q. You had a fairly good knowledge of the farmers in Redpath township at that time?

A. I had, and especially the northern portion of Clifton township.

Q. And Clifton township?

A. Yes, sir, northern portion of it.

Q. And you were able to make a fairly complete list of all that were there?

A. Yes, sir; and also as to the western portion of Gorton township, not so much in Logan township as I have stated before.

Q. How many farmers are residing on their land now in Redpath township?

1001 A. In Redpath town?

Q. Compared to what they did in 1896.

A. I think there are some more there now.

Q. That is, the township is better populated than it was in 1896?

A. I think it is to a certain extent, yes, sir; still the settlement hasn't been growing fast in there.

Q. And is that true also of Clifton township?

A. It is in part true.

Q. You spoke of the Redpath slough?

A. Yes, sir.

Q. And mentioned I think some land that Engstrom had; will you refer to the compilation as to the description of that land that Engstrom had?

A. I think it was Youngberg and Shroeder that I referred to.

Q. Just refer to your compilation. What is the description you gave for the lands owned in Redpath township by Otto Engstrom?

A. Otto Engstrom is the east half of the northeast quarter and northeast quarter of southwest quarter of Section 16.

Q. Some of this land low?

A. I think the south part of it is rather low because he had his pasture way down to the south end of that land so I kind of think it is low. It is close to the ditch.

Q. And was the same thing true, in a measure, of the Shroeder land?

A. Yes, sir, and the Youngberg land.

Q. This land run into the Redpath slough?

A. Yes, sir, it did to a certain extent. In wet years they couldn't——

Q. Almstrong?

1002 A. Almstrong's land was located a little further west, Redpath sloughs come to a narrower point south of him so he wasn't affected quite so much as Engstrom was, that is my opinion.

Q. Just refer to the map a minute, you are acquainted with this land in Sections 16 and 17 of Redpath township, by referring to the map you can get in your mind the location of it?

A. Yes, sir.

Q. Was the south half of Section 17 flat and a little low?

A. All that land in there is flat.

Q. The Mustinka river from the east runs westerly, in a westerly direction, through Sections 16 and 17, Redpath township?

A. The original?

Q. The original?

A. Yes, it wound in through there.

Q. Was its course more or less tortuous, crooked?

A. Yes, sir.

Q. Did it have a defined bank and channel through Section 16 and 17?

A. On some places it had and other places again it did not have.

Q. Is it proper to say that in Sections 16 and 17 or near there, there were places where the Mustinka river had practically no distinct bed or channel?

A. You could easily see the channel—wherever it was shallow it was wide, and where it was more defined or deeper it wasn't wide.

Q. In other words, at those points I have mentioned, the bed and channel became less defined and wider and spread

1003 out more?

A. Yes, on some places.

Q. Have you visited that during this spring or summer?

A. Yes, sir, I have been over it.

Q. And at this time between Sections 16 and 17 as you drive north there——

A. You mean on the north line of Section 16 and 17?

Q. No, I mean driving north and south between Sections 16 and 17, where you cross what might show on this map as the Mustinka river, whether or not there is any defined bed or channel there recognizable?

A. It is a channel recognizable from the north line—well, it is all through in here—there is a culvert in the ditch grade at this point, south [illegible] Section 8.

Q. That is, in Section 8?

A. Yes, sir.

Q. But, for instance, Mr. Ringdahl, where you run along the cut-off ditch up to the line between Sections 16 and 17 and then drive north on the line between Sections 16 and 17 where you cross the old Mustinka river.

A. I haven't driven that line this year.

Q. Will you say whether or not you could recognize any bed or channel there at all?

A. I haven't seen it at that point. I have driven along here on the north side of the ditch this summer.

Mr. Palmer: When you say the north side of the ditch give the section.

A. North side of the first section of the state ditch, south line of 17 and 16 and 15.

Q. Would it be a fair statement to say that this bow of the Mustinka river which has subsequently been cut off by this
1004 cut-off ditch as it went around the bow north of the cut-off ditch, had in some places a not very well defined channel or bed and that in some places in a state of nature the waters when they came along in that bow spread out in the surrounding land to a greater or less extent depending upon the season of the year?

A. No, I don't think I have seen the condition in there so well I can describe it, but I have been in there hunting when there has been some water in there and it appears to me that the channel is well defined on some places and as I stated before it spreads out into pockets in other places, but I never saw it flooded in there in the early years.

Q. You are familiar with the plat book, are you, in Traverse county?

A. I ought to be.

Q. You have examined it many times?

A. Yes, sir.

Q. Now, for the purpose of trying to get a general description of this bow of the Mustinka river that is now cut off by this cut-off ditch in a way, it is not generally speaking a fair statement to say that this upper bow of the Mustinka river has in some places very little of a defined bed and channel, with very little depression beyond that of the surrounding land, and that is indicated, in a way, by the fact that in charting this upper bow of the Mustinka river by common observation it is hard to say where exactly the stream itself in that place did in a state of nature go?

A. No, I think that be going over the ground that you can clearly see where the channel has been because it is so well defined that you
can easily see that, and on some places it is deeper and nar-
1005 rower and other places it is shallower and wider, kind of small pockets, but the channel can be defined wherever I have seen it, the channel can be well defined and seen where it has been.

Q. By close observation?

A. Observation, yes, sir.

Q. And you say that is true now, today—look at the map, please—

of the stream known as the Mustinka river between the southeast quarter of Section 16 and the northeasterly quarter of Section 17 as to the Mustinka river?

A. In there, if I understand the conditions right, which I think I do, the channel divided into two or three smaller channels and went into lower pockets and spread out a little and then had another well defined channel for a short distance and then spread out a little and so on, you know, because you are right in the Redpath sloughs there.

Q. Now, what is the value per acre of the land in the south half of Section 15, Redpath township?

A. About $30 an acre.

Q. What was it in 1896?

A. Oh, about $10.

Q. You speak of having made loans on farm lands in the southwest of 4, is that in Redpath township.

A. No, that is Clifton township.

Q. And having made a first mortgage of $4,000?

A. Yes, sir.

Q. That would be what year?

A. That was in the early spring I think it was of 1915.

Q. And the loan was made on the basis of 40 per cent value?

A. That is what the Union Central base their loans on.

Q. Was it?

A. Yes, sir.

1006 Q. You made the loan?

A. Yes, sir.

Q. And that would make the land worth $10,000?

A. $10,000, yes, sir.

Q. And was the land worth that?

A. The man paid——

Q. No, just answer the question, please.

A. Yes, sir.

Q. You also speak of having made a loan in Section 8, Clifton township, $3,700?

A. Yes, sir, $3,700.

Q. A first mortgage?

A. First mortgage? No, that is in two mortgages for the same company.

Q. But you made a first mortgage of $3,700?

A. No, $3,000.

Q. That is likewise based on a forty per cent valuation?

A. Yes, sir.

Q. Value then was $7,500 of the land?

A. That was all the loan he wanted at that time, so it was a smaller loan than——

Q. What was the value of the land?

A. About $60 an acre.

Q. Mr. Ringdahl, referring to the ditch constructions in the delta zone, outside of this Grant county or first section of the state

ditch and the Mustinka state ditch or second division or extension, what is the first county ditch put in in that Delta zone?

A. County ditch #1, it started at what we called the Loo Bender coulee east of Wheaton and extended easterly to the Twelve Mile creek, from the Twelve Mile creek it extended easterly to
1007 pretty near up to the Five Mile creek or terminated at the north central line of Section 24, Township 127, Range 45.

Q. Did county ditch #1 have its outlet in Twelve Mile creek?

A. It did, part of it. The water from the east was flowing west into the Twelve Mile creek. From this range line between Clifton and Lake Valley it runs easterly for a mile.

Q. And into Twelve Mile creek?

A. Into Twelve Mile creek. From this point, the northeast corner of Section 24, Township 127, Range 46, it runs westerly and terminates at the northwest corner of Section 22, in same township, 127, 46, in what is known as the Lou Bender coulee.

Q. It empties into the Mustinka river?

A. Yes, below Wheaton, southwest of 23.

Q. What is the next ditch that was put in in this Delta zone so termed?

A. County ditch #2, the same year.

Q. And that is shown on Defendant's Exhibit 7?

A. Yes, sir.

Q. And emptied into Twelve Mile creek?

A. Emptied into the Twelve Mile creek on the north line of Section 6.

Q. What was the next ditch that was put in?

A. Ditch #4.

Q. As shown on Defendant's Exhibit 7?

A. Yes, sir.

Q. And that likewise entered into Twelve Mile creek?

A. Yes, sir.

Q. And were there some extensions subsequently made of that ditch?

1008 A. No, sir, it was made at the same time.

Q. What is the next ditch?

A. County ditch #45, it was a clean out ditch of the old county ditch #5, which also runs into the west fork of the Twelve Mile creek a mile west of the village of Collis, Traverse county.

Q. Are all of these ditches numbered consecutively in accordance with their time of construction?

A. Yes, sir. Some of them in there, the last numbers have dropped out.

Q. The next ditch.

A. County ditch #7.

Q. Shown on Defendant's Exhibit 7?

A. Yes, sir, it is known as the Rowan ditch.

Q. It has 1916 marked on it, does that mean the year of construction?

A. Yes, sir.

Q. Have you checked those years so you know?

A. No, I know those years are correct from memory. This ditch wasn't settled for, it was completed last year.

Q. Then you have county ditch #8 and county ditch #9, as shown on Defendant's Exhibit 7?

A. Yes, sir.

Q. Both completed?

A. In 1916.

Q. And both running into——

A. Both running into, county ditch #8 runs into the east fork of the Twelve Mile creek and the ditch #9 runs into the Twelve Mile creek, north line of Section 18, Township 128, Range 45 into the Mustinka river.

Q. County ditch #11?

1009 A. It isn't completed.

Q. And where does that take the water?

A. Takes it up into Rabbit river.

Q. Into Tintah slough?

A. It takes it into the Tintah slough and goes up into the Rabbit river.

Q. Have you looked over this Defendant's Exhibit 7 as to the ditch constructions?

A. No, I haven't closely but the ditches appear to be on here.

Q. County ditch #27 is there?

A. County ditch #27 is there.

Q. It rises in Taylor township and does it take the water southward into the Mustinka river?

A. It takes the water southward into the Mustinka river.

Q. And appears to have some lateral appoaches?

A. Yes, sir, it has some lateral appoaches.

Q. And there seems to be some other——

A. County ditch #36, it was completed in 1916 but has not been settled for at this time.

Q. That takes the water down into the Mustinka river?

A. Yes, sir.

Q. And then you have apparently county ditch 29, you have a recollection of that?

A. 29 and 30, yes, sir.

Q. And 19?

A. 19, yes, sir; 19 and 20. County ditch #19 brings the water into the Twelve Mile creek and ditch #20 brings the water westerly and northerly into the Mustinka river. County ditch #30, east portion of it, carries the water into Twelve Mile creek, western portion of it takes the water down to the Mustinka river.

1010 County ditch #29 carries the water westerly to the Mustinka river. County ditch #9 carries the water westerly into Twleve Mile creek. Also county ditch #10 carries the water westerly into the Mustinka river. County ditch #13 carries the water into the Tintah slough.

Q. What ditch constructions are there here under way this summer not completed shown on this map, that is, as to the digging of them?

A. As far as I know now, there is only one ditch that has not been completed. There is a small ditch northwest of Wheaton that is not completed and it isn't on this map.

Q. Now, Mr. Ringdahl, was it on county ditch #9 that the dredge was working this summer?

A. No, the dredge was working on county ditch #45, I think.

Q. Was the dredge working on a ditch running in Section 35, Monson township, and Section 3, Lake Valley township, in 1917?

A. Yes.

Q. Digging a ditch?

A. Yes, sir.

Q. County ditch #42 shown on the map, the dredge has been working there this summer in the construction of that ditch?

A. Yes, sir.

Q. How big is that ditch?

A. I think it is about 7 or 8 feet deep with a 5-foot bottom and slope 1 to 1, top width in proportion.

Q. And that will carry waters into Twelve Mile creek westerly?

A. Yes, sir.

Q. How many ditches were there in the year 1916 in this delta zone, county ditches?

1011 A. I think that you have to include 1914, 1915 and 1916, and that was about forty ditches.

Q. About forty county ditches?

A. Yes, sir, in those three years.

Q. There would be operative in the year 1916 about forty county ditches?

A. Yes, sir; that is, smaller and bigger, some of them very short.

Q. But county ditches?

A. Yes, sir.

Q. How many judicial ditches have you got in Traverse county?

A. I am not so familiar with them. We have this one here, that is what we call judicial ditch #3, and then portion of judicial ditch #2 is in Traverse county, very little of it though is in Traverse county, and then we have judicial ditch #4 is also a portion in Traverse county.

Q. It takes waters, I presume, into the westerly branch of Twelve Mile creek?

A. Yes, sir, it does, it follows the natural coulees.

Q. And generally speaking how many county ditches have been started or under way since 1916 up to the present time in this territory and in your district?

A. I don't think there is any county ditch under way but I understand there are one or two judicial ditches but they have not been granted.

Q. Well, county ditch #42?

A. That has been granted, you see, and it is under construction.

Q. That is in this year?

A. Yes, sir, this year.

Q. I have been trying to find out how many others under construction.

A. I thought you meant under way to be granted.

1012 Q. No, under way of construction in the year 1917.

A. I think #42 and there is one south of Dumont and one west of Dumont is just finished.

Q. West of Dumont?

A. Yes, sir.

Q. Running into what?

A. It is county ditch #31.

Q. It goes into Twelve Mile creek?

A. A part of it goes into Twelve Mile creek, and part of it goes into what we call, I am sure it goes into what we call the Joe Dod's ravine.

Q. The waters, all of which, eventually reach the Mustinka river?

A. Eventually reach the Mustinka river.

Q. Now, generally speaking, there isn't much question, Mr. Ringdahl, that you had a lot of ditch constructions in Traverse county, either county, state or judicial?

Mr. Palmer: That is objected to for the reason that there is only one state ditch in Traverse county and that is the Mustinka state ditch and that there is no dispute about that, is there, counsel?

Mr. Bronson: I am not answering your question, I am not on the stand. My question covers all three, either county, state or judicial.

A. We had a number of county ditches and two or three judicial ditches.

Q. You have been county commissioner during the time many of these ditches have been constructed?

A. During the time nearly all of them have been constructed.

Q. And you are fairly familiar with the law concerning ditch constructions, whether judicial or state or county?

1013 A. To a certain extent, yes, sir.

Q. By reason of your long experience?

A. Yes, sir.

Q. Those county ditches have been constructed for the purpose of benefiting the land?

A. Yes, sir, lands and roads.

Q. As I understand it, the board of county commissioners is a sort of board of directors of the county, and the board of county commissioners has charged of finally passing upon the county ditches which may be inaugurated by petition and carried on and the various stages of assessment, viewing, appraisal, etc., up to completion?

A. Yes, sir.

Q. Have you had anything as a member of the board of county commissioners to do with the state drainage commission?

A. No, sir.

Q. You know there is a state drainage commission, state drainage board, so termed?

A. I know there is a state drainage board.

Q. You know that under the law they are authorized to co-operate with the board of county commissioners in each county?

Mr. Palmer: That is objected to as, in the first place, an incorrect statement of the law, and not cross-examination, and nothing within the knowledge of the witness.

A. I don't know of any such a law.

Mr. Bronson: Have you ever consulted with the state drainage board?

A. No, sir.

Q. In any manner?

A. No, sir.

Q. Or with the state engineer?

1014 A. No, sir, not as far as our county ditches are concerned.

Q. Have you ever received any objections of any form, nature or description from the state engineer or the state drainage board on the construction of those county ditches?

Mr. Palmer: Objected to as wholly immaterial and not proper cross-examination.

A. No, sir.

Mr. Bronson:

Q. Has there ever been brought to the attention of your board of county commissioners while you have been a county commissioner, either personally or by correspondence or otherwise, any objection to the institution, installation, carrying on or consummation of any of these county ditches?

Mr. Palmer: That is objected to as highly immaterial and not cross-examination.

A. No, sir, not so far as I know, I never heard it, that is, as far as the county board is concerned.

Mr. Bronson: Yes. In the construction of these county ditches, within your knowledge the lands benefited by the construction of the county ditches are assessed in proportion to the benefits they receive?

A. Yes, sir.

Q. And generally speaking such benefits are assessed by reason of the construction of the public ditch as it affords an outlet for drainage or prevents overflow of the lands involved?

A. Yes, the lands are assessed for the benefit of the ditch.

Q. For the benefit of the ditch?

A. Yes, sir.

Mr. Palmer:

Q. Benefit by the ditch, you mean; is that what you mean? You mean, the benefits by the ditch?

A. The benefits derived by the construction of the ditch.

1015 Mr. Bronson:

Q. You are familiar with the provision of law under which county ditches can be ordered by the board of commissioners?

A. Yes, sir.

Q. Under the petition method?

A. Yes, sir.

Q. And the reasons in law for permitting a county ditch to be constructed and directing the making of the same, in a general way?

A. In a general way I have.

Q. You may state whether or not, generally speaking, under your system of public drainage there are these so-termed county ditches, as you call them, and also so-termed judicial ditches, as you call them, and also what we have termed here the Mustinka state ditch, both the original and the second, and also are there town ditches, I mean by that township ditches?

A. No, there is no township ditches.

Q. That is, none of the townships in this delta zone or in Traverse county have availed themselves of the township ditch law, if you know?

Mr. Palmer: That is objected to on the ground there is no such township ditch law.

A. I don't think there is any such a law.

Mr. Bronson:

Q. Now, you were present living in this territory, Mr. Ringdahl, when this so-termed Grant county ditch or first state ditch was built?

Mr. Palmer: You mean the first section of the Mustinka state ditch?

Mr. Bronson:

Q. First section of the Mustinka state ditch, sometimes called the Grant county ditch, wasn't it?

1016 A. I don't know if I have heard that, but I have heard the Grant county section of the state ditch.

Q. You had something to do at that time in connection with the state?

A. I secured, I think, it was three quit claim deeds for the state.

Q. Were you in the employ of the state at that time?

A. They hired me to go out and see those parties and get it, I wasn't hired any other way.

Q. You were employed to go out and get these quit claim deeds?

A. Yes, sir, I think they paid me a few dollars for it, I couldn't say.

Q. By the engineer?

A. Yes, sir.

Q. And you got the quit claim deeds for them?

A. I think I got three of them.

Q. In a state of nature, before the construction of these ditches, was this upper Mustinka river from the point where the cut-off ditch

started or from the place where the first section of the ditch started on down to its confluence with Lake Traverse, adequate in its channel to handle the waters that came from the Mustinka river, the upper Mustinka river and Five Mile creek and Twelve Mile creek?

A. You mean to say the entire system?

Q. Generally speaking.

A. In low water stages or common water stages it does handle the water but not in high stages.

Q. That is, in a state of nature when you had rains somewhat heavy, when you had precipitation somewhat out of the ordinary, the Mustinka river was or was not adequate in its channel
1017 to handle the waters that came to it from those different tributaries.

A. It flooded them at times, same as it does now.

Q. And in the break-up of spring in a state of nature was the Mustinka river able to handle the waters that came down to it in this so-termed Delta zone?

A. It did overflow in a state of nature, that is, at places.

Q. In a state of nature did Grant county in this moraine zone and the lands in Grant county need a ditch to drain them to get rid of the overflow waters there and in order to make the lands tillable?

Mr. Palmer: Objected to as not cross-examination and the witness not having disclosed any knowledge of these conditions in Grant county.

A. I don't know much about the conditions in Grant county after the ditch system started, if they needed it or not.

Mr. Bronson:

Q. You lived in Norcross in 1893, 1894 and 1895?

A. Yes, sir, to 1901.

Q. You are familiar with lands in Gorton township?

A. Yes, sir.

Q. Delaware township?

A. Part of Delaware, I knew the west portion of it.

Q. Elbow Lake?

A. I have been there, yes, sir.

Q. And Sanford township?

A. Yes, sir.

Q. And in Lien township?

A. I don't know much about Sanford township, neither do I know very much about Lien township. I have traveled across Lien
1018 township from the south towards the north of it but I don't know very much about it. It is very much rolling and little small ponds and lakes, etc.

Q. In 1894 in these twonships east of Noreross and in Grant county, Delaware, Gorton, some in Elbow Lake, what was the extent of the farming operations carried on in an agricultural way?

A. That was before I learned very much about those townships in there. The only section of the country that I had any knowledge about in 1894 was the immediate vicinity of Noreross and that was all.

Q. You have no recollection of getting in much grain from Delaware township in 1894?

A. I got some grain from the western portion of Delaware township.

Q. Any from Elbow Lake township?

A. No, sir.

Q. You saw this first section of this state ditch constructed?

A. I did, yes, sir.

Q. Did it carry down water after it was constructed faster or slower than before?

A. In ordinary rainfalls when the river was about half full or so I should judge it did carry the water down somewhat faster and that is the purpose, I suppose, of the construction of the same, to carry off the waters in that vicinity.

Q. Did this ditch after it was constructed carry down more water than it did before?

A. That is a question I don't know if I can answer. I think it carried it a trifle faster when the ditch was about half full or so than it did in nature. I kind of think it did.

Q. Did you observe this, whether or not it carried down
1019 more water, this ditch did, after it was constructed than the river itself did before?

A. The river before this ditch was constructed, it was straggling all over the entire slough that I have mentioned in those sections. When this ditch was put in it carried the water straight through and consequently I suppose that it carried the low water a little faster than it did before.

Q. As you observed it, did this ditch, this first state ditch, serve to drain off some lands in Grant county?

A. I don't think it did.

Q. You don't think it drained any lands?

A. I don't think it did.

Q. In Grant county?

A. No, sir, I think it was built purposely and expressly for the purpose of draining those pot-holes and sloughs in the Redpath sloughs, that is my candid opinion.

Q. The first section of the state ditch?

A. Yes, sir.

Q. Was built to drain off pot-holes in the Redpath slough?

A. That is my candid opinion.

Q. And was not built to drain off lands in Grant county?

A. No, sir, I am positive of that fact because, if I remember right, the fall from Norcross easterly is considerably more than it is from Norcross westerly and for that purpose it wasn't necessary.

Q. After this first section of the state ditch was constructed were lands in the Delta zone and below the Delta zone more overflowed than they were before?

A. In the year of 1897 and in the year of 1915 and 1916 I think they were more flooded than they had ever been before to
1020 my knowledge.

Q. Were these lands that I have talked about in the Delta zone and below the Delta zone from the year 1897 to 1908 and 1909 more overflooded with waters than they ever were before that time?

A. I couldn't say as to those years in between there, I want to leave them out.

Q. I want to confine myself to those years.

A. You see I have only a distinct recollection as to 1897 and to 1915 and 1916.

Q. You stated you came down that time in 1909 or 1910 with some committee to appear before the legislature?

A. Yes, sir.

Q. From Wheaton?

A. Yes, sir.

Q. Who was on that committee with you?

A. There was quite a number of farmers.

Q. Well, name some of them.

A. I think Gust Skogland, Alfred Anderson, Jim Fish, Thomas Heggen, I am not positive if those names are exactly correct, D. J. Neuman, I don't believe I remember any more names.

Q. About how many were there altogether?

A. C. E. Ringstrom was also. There must have been about twelve or fifteen.

Q. Or seventeen?

A. Twelve or fifteen.

Q. Might have been seventeen?

A. For all I know, there might have been.

Q. Were you one of them?

A. Yes, sir.

Q. And you recollect of a committee being appointed by
1021 the legislature to investigate matters of water conditions up in your county?

A. I think it was.

Q. And those farmers appeared before the committee?

A. I think they did.

Q. And did you appear before this committee?

A. Yes, sir, I did.

Q. Five of them, were there not?

A. There was quite a number of them that appeared before the committee.

Q. No, but there were five on the committee?

A. Five on the committee? I couldn't say for sure, I think that——

Q. Four or five?

A. Yes, I think about four or five, I did not see any more than two.

Q. And where did you come then in those days, down in the old capitol or here?

A. In this capitol.

Q. And did they take testimony?

A. They took some testimony, yes, sir.

Q. Did you give some testimony?

A. I think I did.

Q. You were sworn?

A. No, sir.

Q. And the other farmers gave testimony?

A. I think they did.

Q. Was it taken down by a stenographer?
A. I think it was.
Q. And what you said then you said from what you knew?
A. I suppose I did.
1022 Q. As well as the other farmers that you heard testify there?
A. Yes, sir.
Q. And you came down before this committee to state about the conditions that you had observed with reference to flooding of waters up in Traverse county?
A. I think we did, but that was waters close to Wheaton, it wasn't any waters connected with this old Mustinka state ditch, you understand.
Q. You came down, you and the other farmers, for the purpose of getting some relief from flood conditions that had existed at Wheaton?
A. Yes, sir.
Q. And appeared before this committee and gave your testimony concerning the conditions that existed at that time with reference to floods?
A. Yes, sir.
Q. You owned some land at that time in this Delta zone and some outside of the Delta zone?
A. I think I owned only one quarter section and that was in the Delta zone—no, and one outside; I owned two quarter sections.
Q. You think that time that you were down here as you can recollect it was in 1909 or 1910?
A. It seemed to me it was in the year of 1909.
Q. Was it true at that time, Mr. Ringdahl, that about 8,000 acres of fertile lands, farming lands, in Traverse county, situated adjacent to the Mustinka river previously under cultivation for about thirty years and during that time never overflowed in the crop seasons of the years 1897 and 1908 were overflowed by the overflow of the Mustinka river?
A. I don't remember as to that; I know that some of those
1023 witnesses testified that some of the lands were overflowed but just how extensively I don't remember.
Q. I am asking you to state whether or not in your recollection and observation it was true that upwards of 8000 acres of lands adjacent to the Mustinka river that had previously never been overflowed, had previously been cultivated for about thirty years, in the crop seasons of the years 1897 and 1908 were overflowed by the overflow of the Mustinka river?
A. I can't say that it could be that many acres, still I have not checked it up so I don't know.
Q. You wouldn't say it was right or wrong?
A. No, I wouldn't want to say anything as to that *that*.
Q. Was it generally true that on these lands which were overflowed that the crops were destroyed by reason of the overflow?
A. I think that was true then and it is even true now, just the same thing.
Q. Just answer my question, please. I am talking now about the years 1897 and 1908 and no other year.

A. It was true.

Q. 1897 and 1908?

A. Yes, sir.

Q. And it was also true, wasn't it, that the value of these crops destroyed by this overflow amounted to over $28,000?

A. I couldn't say as to that but I suppose it would amount to considerable during all those years.

Q. You came up here, did you, Mr. Ringdahl, with other farmers to testify and give testimony before this committee?

A. Yes, sir, my testimony was merely directed towards the construction of the first state ditch.

1024 Q. Yes but you were here with those farmers?

A. I was, yes, sir.

Q. And you heard something, you heard some of them testify?

A. I heard two or three of them testify, I think.

Q. Was it true also that by reason of the overflow of these lands from 1897 to 1908 the lands so overflowed were depreciated in value?

A. Land that is overflowed is always of less value than lands that are not overflowed.

Q. Is it true that this overflow of these acres of land that I have tried to describe to you were so overflowed by reason of the construction of the Mustinka state ditch constructed by the State of Minnesota during the years up to 1896 in order to drain lands situated in Grant county, Minnesota?

A. I couldn't state as to that, I didn't *heard* of it——

Q. Was it in your observation, and you have testified about knowing about this ditch and about knowing what its operation was during all those years, did, I am asking you, this first Mustinka state ditch constructed by the State of Minnesota, occasion the overflow of these lands that we have been just talking about or did it not?

A. I can't see how it could cause any more overflow than it ever did before because it had so much water to carry from that zone.

Q. Then, if I understand you correctly, the overflow of these 8000 acres of land I have talked about in Traverse county from the years 1897 to 1908 was not occasioned by the construction of this first Mustinka state ditch?

A. It may have had a tendency to add some of the waters to those lands.

1025 Q. But it wasn't the primary cause of the overflow?

A. I couldn't say that, I doubt it very much.

Q. You doubt it very much?

A. Yes, sir, if it was the entire cause of the overflow.

Q. Will you testify here before the Commissioner that it was a partial cause?

A. I think it is, it will carry down a little more water in common stages of water.

Q. My question addressed to you is whether or not you are willing to testify in this proceeding that the construction of this first Mustinka state ditch was at least a partial cause of the overflow and the damage to these lands I have talked about?

Mr. Palmer: What lands are you talking about, Mr. Bronson?
Mr. Bronson: Last above mentioned.

Mr. Palmer:

Q. Mr. Ringdahl, do you understand at this time what lands are referred to in these questions?
A. I suppose that he refers to the lands from the Swedish Lutheran church and down to Wheaton.

Mr. Bronson:

Q. I am referring to the lands that you referred to when you appeared down here before the committee of the legislature to give testimony, that is what I am referring to.

Mr. Palmer: I object to that because the witness has testified that he did not refer to any lands, that he simply testified as to the construction of the first section of the Mustinka state ditch.

A. It was claimed to be——

Mr. Bronson:

Q. Well, was it?
A. I tell you I couldn't say that for sure. I think it had some part of it to do with it.
1026 Q. How much of a part?
A. I think it brought down water a little bit faster than it did before.
Q. And perhaps in larger quantities?
A. I couldn't say as to that but in low stages of water I will say that the water *runs* a little bit faster in the first section of the Mustinka cut-off than it did in nature.
Q. Did the Mustinka, this first Mustinka state ditch, deepen, widen and straighten out some of the channel of the old Mustinka river?
A. Yes, sir, it did.
Q. So that when it was completed, it was bigger, wider and straighter than the old Mustinka river?
A. Yes, sir.
Q. Will not a bigger, larger ditch than the old Mustinka carry more water than the Mustinka river, answer yes or no, if you can?
A. I tell you I don't know if I can—I think I answer it yes.
Q. Now, will you say that the purpose of this first ditch constructed was not to drain lands situated in Grant county then owned by the State of Minnesota so as to make the lands fertile, valuable and salable and for no other purpose?
A. I don't know if the State of Minnesota owned any land in that section but I think that the State of Minnesota owned some land in Traverse county, I couldn't say.
Q. Wasn't the purpose of this first Mustinka ditch, state ditch, to drain lands in Grant county?

A. Not that I know of. I always understood it was to
1027 drain the lands in Redpath sloughs, and part of those Redpath sloughs extend into Grant county, so that you might term it into Grant county on that account.

Q. You say part of the Redpath sloughs extend into Grant county?

A. Yes, sir, I think you can call it that.

Q. Name the Redpath sloughs that extend into Grant county and give me the sections.

A. I think that Section 19, that is, at least the central portion of it in or near where the old channel of the Mustinka river passed through it, is low and I would term that portion of it as part of the Redpath sloughs.

Q. Section 19 in Grant county?

A. Yes, sir, in Township 128, Range 44.

Q. After this first ditch was constructed did the old channel of the Mustinka river below where this ditch then ended overflow each year after the construction of that ditch at times of rain or melting snow?

A. I couldn't testify as to that because I haven't been up and along that old state ditch for years because it is so wet and no roads in there and nobody ever drives there. I remember that in the fall of 1915 I was up in Section 21 and 22 there and hunted ducks and that is about the only recollection and then it was water in those, practically all over Section 21, standing 3 or 4 inches deep.

Q. What year was that?

A. In the fall of 1915.

Q. I am addressing my questions to you from the years 1897 to 1908?

A. I couldn't say as to that, on the ground that I don't remember and recollect the dates and years.

Q. Did this first state ditch you mention serve to drain
1028 this Redpath slough?

A. It did to a certain extent, yes, sir.

Q. Went right through it?

A. Went right through it.

Q. From the beginning to the end, practically?

A. Yes, sir.

(At this time recess is taken until 2 o'clock P. M.)

September 28, 1917, 1:30 p. m.

Hearing resumed pursuant to adjournment. All parties present.

Cross-examination of WILLIAM RINGDAHL resumed.

By Mr. Bronson:

Q. Mr. Ringdahl, were you familiar at all with the flood conditions in this flood plain that you described in your direct testimony in the years 1894 to 1897?

A. That was in the Redpath sloughs and Tintah slough, I suppose you mean?

Q. In your direct testimony you mentioned about certain flood waters in a district, generally speaking, from the Milwaukee tracks up to a certain church, the Swede church, and with reference to that district you used the term "flood plain". Now can you answer the question?

A. No, sir, I wasn't at Wheaton in the spring of 1894, 1895 or 1896, that is, to my knowledge, so I would have no knowledge as to floods previous to the year 1901.

1029 Q. Can you give any estimate, Mr. Ringdahl, as to the amount of lands that the construction of the first Mustinka state ditch caused to overflow in any of the years 1897 to 1908, simply in a general way?

A. No sir, I couldn't do that. There was only one year when I saw the water in there real high and that was in the spring of 1897. That is the only time that I saw the water extending clear from the townsite of Norcross and northwesterly as far as the eye could see. And that was for a few days in the early spring, the latter part of March, 1897.

Q. Between the years 1897 to 1908 you had occasion to observe, did you not, the overflowing of this so-called region which you have termed a flood plain in your direct testimony?

A. I saw it on several occasions, yes.

Q. And generally speaking, as to the extent of the territory it covered, would it amount to eight thousand acres?

A. Now, it overflowed from the Chicago, Milwaukee Railroad bridge northwest of Wheaton and practically up to the north line of Section 24, Township 128, Range 46. That is as far up as I saw any water. I didn't examine it the other mile above there, and I have seen water there quite wide. That is, in flood time, you understand.

Q. Would you say, Mr. Ringdahl, that at times of high water the Mustinka river, in its natural condition, was insufficient to carry off the waters falling within its natural drainage basin?

A. Now in time of flood it was insufficient.

Q. That is what I mean—high water?

A. Yes, and it is insufficient at this date just as much as it ever was.

Q. That is the Mustinka river is?

A. The Mustinka river—the entire river clear from where

1030 this cut-off started from Twelve Mile creek.

Q. As well as above the cut-off?

A. Now above the cut-off the conditions are not the same. The Twelve Mile creek, as I have stated before here, has a great big channel with high banks on both sides, has a good natural fall to the northwest, and it carries the water inside its banks up to as far as, I would say Section 18, Township 128, Range 45.

Mr. Palmer: When you say Mustinka river at this time, do you mean the dredged-out Mustinka?

A. Yes, the dredged-out river at this time—the present year—1915, 1916 and 1917.

By Mr. Bronson:

Q. In other words, do I understand from your testimony that the Mustinka river and its tributaries in a state of nature, and the Mustinka river now as rectified, as deepened in its channel, as aided by straightening, as aided by the cut-offs through the said construction, as also aided, if I may use the word aided, by the artificial county ditches and judicial ditches comparatively carry the same waters as they did formerly and do now?

A. I don't know if we can compare those conditions for the simple reason that in the years 1914, 1915 and 1916 we had such an abnormal rainfall that I don't believe that we can even compare it.

Q. In other words, do I understand from your testimony that the years 1914, 1915 and 1916 were years of rainfall beyond that of any other year in your experience?

A. In my experience, yes, sir, that is a fact.

Q. And that there was no other season in the years that you have lived there where you had a rainfall equal to that in 1914, 1915 and 1916?

1031 A. Not so continuously.

Q. Now I will ask you to state whether or not the Mustinka river in its rectified channel—and you know what I mean by rectified?

A. Yes sir.

Q. And with the cut-offs and with the tributary ditches, both county and judicial, will carry water faster than the Mustinka river with its natural tributaries in a state of nature?

A. Now as long as the water is confined within its banks, as I have said before here, I think it will carry it faster.

Q. Will you say it will carry it as fast by twenty-five per cent, as much as twenty-five per cent faster?

A. That is pretty hard to say. I wouldn't undertake to answer that question because——

Q. Well you have had some experience in civil engineering?

A. No, not in that line. I think it will run faster, I admit that; that is my opinion.

Q. And would the new Mustinka river with all these county and judicial ditches and rectified channels carry more water than the natural Mustinka river and its tributaries?

A. It will within its banks but in time of flood I don't think it will.

Q. Well, I am speaking about the river and its tributaries in a state of nature, and about the river and its tributaries under artificial conditions, what they will carry, of course, within their banks, and I understand you to say that the Mustinka river as rectified with the artificial conditions existing will carry more water than the original Mustinka river?

A. It will carry it somewhat faster down to the lake.

1032 Q. Will it carry more water?

A. I can't see how it can carry any more water because it

has that basin to take from and that is all. It can't carry any more water than there is in that zone.

Q. Will it carry more water in a given time?

A. I think it will as long as the water is confined within its channel—I think it will.

Q. Carry more per day?

A. I think it will do that to a certain extent.

Q. And will carry it faster per day?

A. I kind of think it would.

Q. Now all of these ditches that you have mentioned, generally speaking, Mr. Ringdahl, are draining ditches, are they not?

A. Yes, sir.

Q. Constructed for the purpose of drainage?

A. Yes sir.

Q. Of the lands which they benefited?

A. Yes, sir.

Q. Now concerning the second ditch, you have used the term "second ditch"—that means the extension ditch—the Mustinka State ditch—you said you worked on that checking that up?

A. Yes, sir.

Q. What was your official title, if any?

A. I don't know what I should call it.

Q. Who hired you?

A. Mr. Ralph hired me in the first place, and then Mr. Willard.

Q. You didn't prepare any plans of this ditch?

A. No sir.

Q. You had certain data given to you by Mr. Ralph?

1033 A. Yes, sir, I had.

Q. You produced some books from which you have read certain data?

A. Yes sir.

Q. And all you know about the data in the same is such as the books themselves contain?

A. Certainly.

Q. You haven't taken any elevations yourself to check the data?

A. Now, I don't know just what you mean—across the cut-off ditch, I measured the depth and the width across that.

Q. On the ground?

A. I had a boat and came behind the dredge and I measured it six feet from the edge, and then in the center, and then six feet from the other edge.

Q. You start off with Station 1 and you read from the book—"7 foot cut?"

A. Yes sir, 7 foot cut.

Q. Now what did you do about that?

A. I just marked all those measurements that I found. I marked them down and made a report and sent the report down to the office here in St. Paul to the State Drainage Commission.

Q. That is, as the ditch went along toward its construction from time to time—you had this field book mentioned in your possession?

A. Yes sir.

Q. And you checked the construction or digging as they went along?

A. Yes, sir, and sent the results—that is what I found to be the result down to the State Drainage Commission.

1034 Q. Now it appears from this data that you have read that the original plans were departed from to some extent?

A. Yes, sir.

Q. As the work was carried on?

A. Yes sir.

Q. And that some cut-offs that were planned were not put in?

A. Yes sir.

Q. And some minor variations were made?

A. Yes sir.

Q. In the construction as they went along from time to time?

A. Yes sir.

Q. Now as those constructions proceeded from the first ditch down toward Lake Traverse, the Mustinka river in its natural state was more or less winding?

A. Yes sir, considerably so in the upper end and lower portion of it.

Q. And I presume as you went along in the construction of this ditch you tried to rectify the channel here and there as much as you could?

A. Now there wasn't any rectification, as far as I know, from where the cut-off flows into the old channel west of the Swedish Lutheran church in the town of Monson, as we have been talking about, from there down to the north portion of Section 7, Township 127, Range 46.

Q. What I am trying to find out is whether or not in the construction of that ditch, following the channel, you would perhaps at times vary from the thread of the stream maybe five feet this way or five feet that way in order to make a little rectification?

A. Now they followed the main channel. The dredge was following the main channel and of course they would nip off a

1035 little corner here and a little corner on the other side as they went along.

Q. As they went along?

A. Yes sir.

Q. Now you recently made some measurements up there of the old Mustinka river channel, you say, from this cut-off on down?

A. Yes sir.

Q. Did that with a tape, you say—steel tape?

A. Not far from this cut-off.

Q. Did you do that with a steel tape?

A. Yes sir—on this cut-off you know. I didn't check the whole ditch down from the big cut-off down to Hagens. I haven't gone over that part of it.

Q. But you checked off this place where the cut-off was made?

A. Yes, bends where the cut-offs are made.

Q. And made computations by these measurements of the amount and the distances of the old channel at the cut-off?

A. Yes sir.

Q. And have measured around the inside of the loops at these different cut-offs?

A. Yes sir, with the exceptions—I will say that there was a small nipping off on a corner where the channel went outside and I suppose it would make a hundred feet difference. We didn't measure that. That is one place we didn't measure.

Q. You spoke of in the spring of 1916 visiting the bridge near Wheaton—the wagon road bridge—I suppose you referred to?

A. Yes, we were all walking on the Chicago, Milwaukee Railroad bridge. We wouldn't go acrossed on the wagon road.

Q. Why?

1036 A. Because the water was running acrossed there.

Q. Running acrossed the wagon road?

A. Yes sir.

Q. How deep was it?

A. I think on the south side it must have been two feet anyway.

Q. Are there any waters now standing on any of these lands you have been talking about?

A. At this time?

Q. Yes.

A. No sir.

Q. And why not?

A. It has been a dry season.

Q. Quite dry?

A. Very dry.

Redirect examination.

By Mr. Palmer:

Q. Your statement that the present rectified Mustinka river with the cut-offs and the county ditches carries perhaps more water in a day and carries it somewhat faster in a day do you confine that to any particular season or time, Mr. Ringdahl?

A. I confine that to the ordinary water stages when the water is inside of the banks of the river or the ditch, as you may term it.

Q. And as the flood times, times of heavy rainfall or at the time of the spring break-up, what effect has it?

A. Now my candid opinion is that it carries less water in the present state than it did in the time of nature.

Q. In times of flood?

A. Yes sir, in times of flood.

1037 Q. Or the spring break-up?

A. Yes sir, several reasons for that.

Q. You may state them briefly?

A. In the first place, the present Mustinka channel is deeper with high banks on both sides, and it fills in with snow and that snow freezes in so you might say a part of it is nothing but a solid mass of ice, and when the flood comes into the river, because the snow melts on the land, on the prairie and in the fields quicker than the ice and the snow will do in that deep channel, then of course it is

going to flow on top of it and then we have these banks across the flood plain that will hinder the flow of the water down the flood plain. That is my observation.

Q. And in times of summer flood, if there are any, how does it operate?

A. The conditions are the same, with the exception that the channel as it is now will hold more water on account of the ice and snow having melted and disappeared, but the water outside of the channel is flowing slower today than it did before that ditch was constructed.

Q. Does the present rectified river, this cut-off and the first section of the ditch, does it draw the water from any distance on either side of it?

A. No sir. It simply gives the water that comes from Grant county in the old Mustinka channel and what water accumulated in and about this ditch a somewhat better outlet.

Q. Except in times of flood?

A. Yes sir, of course nothing can handle it then.

Q. Then is there any substantial difference so far as flood waters are concerned in the condition of the lands adjacent to this river channel than there was before in a state of nature?

1038 A. What I have seen of it it isn't. Just as much water there in 1914, and 1915 and 1916 as I have seen there before.

Q. And how about the spring of 1917?

A. The water was very high, very high.

Q. Flood conditions there?

A. Yes, sir, not as much though as in 1916 and 1915.

Q. I take it, Mr. Ringdahl, from what you have said that your understanding of the purpose of this later construction was to obviate the flood conditions that existed in times of high water and in the spring break-up in the Mustinka valley from the Milwaukee railroad bridge, northwest of Wheaton, northeasterly to a point where the present cut-off enters the old channel?

A. Yes sir.

Q. Now has the ditch done that?

A. It hasn't done it in time of flood, no sir. And I confine my answer to the fact of what I have seen after the construction of the ditch and what I have seen previous to the construction of the ditch.

Q. You mean you found or base your answer upon that?

A. Yes sir.

Q. And do you think that under the present conditions that the flood waters either in time of the spring break-up or times of excessive rainfall at other seasons get into Lake Traverse now any more quickly than *then* they did before?

A. Not flood water, no.

Q. This Twelve Mile creek, you spoke of it as a strong, heavy stream of water, having high banks and very well-defined. Does that condition obtain after you leave the north line of Section 18?

A. Yes sir.

1039 Q. Township 128, Range 45?

A. Yes sir.

Q. Now from there on around the northerly bend what is the nature of the channel?

A. The banks on both sides are somewhat shallow.

Q. I take it that that is why the water goes over to the north into the Rabbit river?

A. Yes sir, and through Sections 18 and 19 and part of 20 and 29 and 30. The river is very wide there and very high banks.

Q. Now passing northward from there around the bend, we will say northward from the north line of Section 18?

A. The banks are getting lower, and at the extreme northern portion of the bend they are still lower, in there just west of what we call the Teskey farm.

Q. And that is why it has been said here the water overflows northward into the Rabbit river?

A. Yes sir.

Q. Does it flow also to the south and southwestward?

A. Yes sir.

Q. Back into the channel of the Mustinka river?

A. Yes sir. It flows across here over this steel bridge on the north line of section 18, and runs across westerly and strikes a coulee over in section 12 that extends into 11. It goes into that coulee and then goes into the old Mustinka channel again.

Q. Now following that channel on from the north line of 18 around the bend, is it well-defined?

A. Northwesterly in Section 11 it has somewhat higher banks than it has west of Mr. Teskey's buildings.

Q. In section what?

A. Section 12 and 1.

Q. Yes, but is the channel readily discernible there—

1040 can it be easily seen and followed?

A. Yes sir.

Q. All the way around?

A. Yes sir.

Q. Now there has been some testimony here by Dean Shenehon that from a point about a thousand feet north of where the present cut-off intersects the old channel, the old channel is very indistinct and can hardly be discerned—what about that?

A. It has a good big channel there. There is no question about that.

Q. It can be readily observed?

A. Yes sir.

Q. Is it more or less marked and plain there than it is farther north around the bend?

A. About the same. The highest portion is by the old Peter Monson farm, as we call it.

Q. What was that?

A. That was in Section 2, I think of Township 128, Range 46.

Q. I asked you on direct examination whether in the month of June, 1914, this Mustinka ditch was, so far as bringing down the extra water from the territory northeasterly from the railroad track is concerned, as complete then as it ever was and you answered no, What did you mean by that?

A. I don't believe that you ever asked me that question the way you ask it now.

Q. Well, did you understand the question at the time do you think?

A. No, I didn't.

Q. Now what I mean to ask is this: so far as it affected
1041 the water or might have brought down any extra water from all of the territory northeasterly of the Milwaukee Railway track was it just as complete in June, 1914, as it was when it was finished?

A. I kind of think it was, because after you passed under the railroad bridge and also under the wagon bridge and the channel was cleaned out below the railroad bridge and also below the wagon bridge, it simply opened up the channel in good shape for the water from above, and when you come down as far as Section 23 you will find back water there from the lake. I know that a southwest wind from Traverse Lake will raise the water in the channel at Estgard's and Schumacher's considerable.

Q. What sections are those in?

A. That is in Section 23, Town 127, Range 47.

Q. And did the dredge to any extent obstruct the flow of the water, the dredge in the river?

A. I don't think it did.

Q. Did you see the water flowing past the dredge?

A. Yes sir, on both sides of it. And it raised when the river went up because it was a floating dredge like a boat. It raised on top of the water.

Q. Now this wagon bridge that you are speaking of, how far is that from the railroad bridge?

A. About 100 feet.

Q. Downstream?

A. Downstream—it couldn't be a hundred feet.

Q. They are practically right there together?

A. Yes sir.

Q. Is the river any larger now at the railroad bridge than it was before this ditch was constructed?

1042 A. It is deeper.

Q. Is it any wider?

A. No, the same bridge is there.

Q. You have spoken of surface waters remaining on some of the lands in this so-called delta zone—is there any more surface water that stands in the low places and depressions in this delta zone, so-called, than on the other lands in Traverse county?

A. No sir, except in those sloughs in wet seasons. I will make that exception.

Q. What sloughs do you mean?

A. Redpath sloughs and Tintah sloughs.

Q. Now you have spoken of tiling—that you have done considerable on your place?

A. Yes sir.

Q. What can you say as to tiling done by the farmers generally through this so-called delta zone and territory surrounding it?

A. The last past two years more tiling has been done in Traverse county than at all times previous before that.

Q. Well, of course, I don't know how much was done previous—what would you say—has the tiling of lands been extensive?

A. I don't know as I am able to give you the number of feet and if I would give you an approximate number it would not be—it might not be anywhere nears right.

Q. Well, perhaps you can make your answer more intelligent?

A. If I say forty or fifty miles of tiling laid in the last two or three years.

Q. Where did these tile have their outlets, most of them?

A. They have them into Twelve Mile creek, the Mustinka river and county ditches—mostly into county ditches.

1043 Q. Did those lands need tiling to improve them?

A. All level lands need tiling. Tiling is good for any kind of land whether it is level or rolling.

Q. These tiling systems, are they all private work, done by private owners?

A. Most of them. I think we have two county tile ditches.

Q. In this delta zone, are they?

A. No, one is in the township of Lake Valley and one in the Township of Monson.

Q. Did they outlet into this Mustinka river or some of its ditches?

A. One of them has an outlet into the Mustinka river and the other one has the outlet directly into Traverse Lake, four miles south of White Rock.

Q. Are there any private open ditches into any of these tributaries of the Mustinka or the Mustinka or the county ditches?

A. Quite a number.

Q. You have spoken of the rise in value of farm lands, particularly those that you yourself have bought. Has there been a considerable rise in recent years of farm lands in Traverse county?

A. It has.

Q. Has it been any more marked in this territory of this so-called delta zone than any other portions of the county?

A. No sir.

Q. Coming back to 1896 and speaking of this so-called delta zone. I neglected to ask you if they had at that time any roads over that territory?

A. Yes sir.

Q. What kind of roads?

1044 A. Wagon roads.

Q. Good roads or poor roads?

A. Oh, medium fair roads. The main thoro-fares were graded up the same as they are now.

Q. And how did the roads through there, as to there being dry and passable, compare with the other roads of the county, generally?

A. About the same.

Q. And in that territory did you have schools and school-houses, public school houses?

A. Yes sir.

Q. Do you recollect about how many in this so-called delta zone?

A. Now if you let me take the other map I think I can give you that. There was one school house on the Northwest corner of Section 17.

Mr. Bronson: This was in 1896?

A. Yes sir, I will give them that I remember.

Q. What township?

A. 128-45. I am positive that the school house was also on the southwest quarter of Section 27.

Q. Same town and range?

A. Yes sir. I don't remember of any more school houses in Redpath. There was one west there that a portion of Redpath belonged to. That was in Monson township. There was one on the Southwest quarter of Section 24, in Township 128, Range 46, that a portion of Redpath belonged to but it wasn't in this delta zone. There was also a school house on the west side of Section 8, Township 127, Range 45 about that time. It is pretty hard to remember those things when I have no data of them, but I will do the best
1045 I know how.

Q. Is it your recollection that there was a school house there?

A. That is the best recollection. It might not have been there that year. I couldn't say, but my best recollection is that it was. Then there was one school house on the southwest quarter of Section 14, Township 127, Range 45.

Q. Now in Tintah?

A. There was a school house on the south side of Section 29—I think it was 29.

Q. In Township 129, Range 45?

A. Yes sir, in the Township of Tintah.

Q. Now you spoke, Mr. Ringdahl, of leaving out some settlers in this so-called delta- zone, in your testimony previously given that you had forgotten. Will you kindly give those now?

A. Yes, in giving the names I omitted a few. I jumped one or two names.

Mr. Bronson: Is the witness reading from the same memorandum?

Mr. Palmer: Yes sir.

A. G. H. Hanson, which was one of the oldest settlers in there living on the north half of Section 14, Township 128, Range 45. He had fairly good buildings and a portion of his land was under cultivation.

Q. About how much?

A. I should judge about eighty acres.

Q. There was also the southwest quarter of Section 26, Township 128, Range 45?

A. Yes, I omitted that. The owner was Leonard Hawkinson. His brothers worked the land for him while we was away in
1046 1896, but he worked it I think some one or two years previous to that time.

Q. Any buildings?

A. Yes, he had a small house there and a low barn, and somewheres about sixty or seventy acres under cultivation. And then E. V. Sjolander. I remembered him because he lived close to Norcross and he hauled considerable grain to me. I am not so positive of the location of the land but I think it was either the Northeast quarter of 19 or the Northwest quarter of 20 that he owned, Township 128, Range 44.

Q. That would be Gorton Township, Grant county?

A. Yes sir. He had a pretty good house and fair barn, and about sixty acres under cultivation. Then there was Ed Flocker. He was a good farmer and lived southwest of Norcross. He hauled considerable grain to me. I kind of think he lived in the southern portion of 33. I couldn't swear to that, but anyways it was in that country, Township 128, Range 44. I was up to his house once or twice and he had a fairly good house and a small barn, and I should judge about 70 or 75 acres under cultivation.

Then there was Stubson brothers—three brothers that lived right south of Norcross. I think they lived on the northeast of 33, or some portion of 33. I think it was just a little south and towards the west of Norcross. They were tenants, however. They were right on the extreme line of this Delta zone; part of the land extended into that delta zone.

Q. What was the condition of their farm?

A. They had a good house and a low barn and had a shed for the granary, if I remember right, and somewheres about eighty or
1047 ninety acres under cultivation. I guess that is all that I can remember.

Q. Now when you speak of these farmers having a certain number of acres under cultivation, do you mean by that that the balance of their lands were unfit for agricultural use?

A. No, sir, it was in the natural prairie, and a great portion of that prairie land was used for hay, cutting hay for their stock, and part of it was pasture. They had larger pastures those days than they can afford to have at the present time. At the present time they seed in some of their plowed lands for pasture. Those days they used the natural grass for pastures.

Q. Compared with other agricultural communities in that section of the state what percentage of their land could be used either for hay cutting, pasturage or actual tilling of the soil in that county and the surrounding counties?

A. In the township of Clifton every foot of that land can be *be* broke and put under cultivation and crops raised, with the exception of the rivers themselves and maybe a low pocket hole somewheres here and there. In the township of Redpath every acre of that township can be farmed and put into crops with the exception of those Redpath sloughs as hereinbefore described, and those would be put into

cultivation if properly drained. I would also put in there, with the exception of the river bottoms and the land sloping toward the river which cannot very well be farmed on account of its slope.

Mr. Bronson: Now you are talking about the present, Mr. Ringdahl?

Q. Are you speaking of the present time or back under natural conditions there?

A. Under all conditions. Conditions existed the same before as they do to-day and to-day as they did before.

1048 Q. Except that I take it this drainage has improved the lands so it makes the crops more abundant?

A. Certainly.

Q. And perhaps more certain?

A. Yes sir. Another thing I want to say from my own experience.

Mr. Bronson: I object to any volunteer statements.

Q. Have you anything further you can say in response to that question.

A. Now you was talking about ditching and that it was draining the lands?

Q. Yes sir.

A. Now all these ditches will tend to draw the water from the adjacent lands. The tile ditches will draw the waters from the lands adjacent to it and after that is done it forms a reservoir for more water so the land is in better shape to handle the next rainfall that comes, and it will gradually pass away. That is what the drainage and tiling system will do.

Q. That is what I wanted to ask you about—whether this system of ditching and tiling and cultivation of these lands has an effect on the run-off of the lands?

A. It certainly has.

Q. Now what effect?

A. It is the effect that, as I stated, these ditches will draw the water from the lands through the soil, and when the next rain comes it will find this dry ground, or practically dry ground to soak into and it will form a reservoir for more water as these tile ditches and other ditches will draw the water again, and so on. It will form a

1049 reservoir for the water and the water in that way will run off gradually from the lands.

Q. So that as a result of your experience and observation you would say that the run-off would be more slow and gradual and the surface waters and ground waters delivered more slowly, evenly and gradually to the streams than they were in a state of nature?

A. Certainly they are, with the exception I would say of a very heavy rainfall of several inches—say three or four inches or so maybe—then it would be too much for the soil to take, and then it will run off into the open ditches, and then the ditches will carry it off to the outlets and it will start to work over again the same way.

Q. I call your attention to Defendant's Exhibits 12 to 21 inclu-

sive, and will ask you what those are, Mr. Ringdahl, just in a general way?

A. They are photographs taken of grain fields in that yellow area.

Q. In the yellow-shaded area on the map, Complainant's Exhibit No. 1?

A. Yes sir.

Q. Being the lands in the Bois de Sioux valley claimed to be injured in the bill of complaint here?

A. Yes sir.

Q. When were they taken?

A. On the 13th day of August, 1917.

Q. By whom?

A. By myself and the photographer of Wheaton, Mr. Anderson.

Q. What is his first name?

A. C. W., I believe.

Q. Did you see them taken?

A. Yes sir.

1050 Q. Are they correct representations of what they purport to be? Or purport to portray?

A. Yes sir.

Q. Now commence with Exhibit 12 and tell me what that is?

A. View from the southeast corner of Section 4, Township 128, Range 47, looking northwesterly into North Dakota; that is, looking toward North Dakota, but this is taken in South Dakota. The field is in the southeast quarter of Section 4, Township 128, Range 47, Roberts county, South Dakota. That is on the west side of the wagon road running north and south.

Q. Now is there written in pencil on each of these photographs a correct statement of the point from which they are taken and what they represent, with the exception of Exhibit 21, on which the writing is with pen and ink?

A. Yes sir.

Q. Is that correct?

A. Yes sir.

Mr. Palmer: We offer Defendant's Exhibits 12 to 21 inclusive in evidence.

Recross-examination.

By Mr. Bronson:

Q. Did you take any views, Mr. Ringdahl, of the farms in the yellow portion of North Dakota grown up with cat-tails?

A. No sir.

Q. Did you see some?

A. Yes sir.

Q. Each of these photographs has written on the back of it, as I understand, the land that it covers in the photograph?

A. Yes sir.

Q. And the date taken?

1051 A. Yes sir.

Q. That is in your handwriting?
A. No sir, it isn't.
Q. Have you checked it over so you can swear it is correct?
A. I want to check it over. Mr. Palmer wrote it. I dictated it to him, but I am going to check it over to be positive that they are absolutely correct.
Q. I wish you would check it over when I get through with your examination and then state in the record whether it is correcy or not.
A. Yes sir.
Q. Now, if I understand you correctly from your testimony in the years 1914, 1915 and 1916 you would have had just as much water, just as much flood conditions on the lands we have been talking about in the delta zone and on this flood plain if the natural conditions existed, as you had with these artificial conditions such as we have mentioned here in the evidence?
A. We would have had?
Q. Yes.
A. In the natural condition would it be as wet?
Q. Yes.
A. I suppose so.
Q. It is your opinion from observations you have made that in the years 1914, 1915 and 1916, with the artificial conditions removed, the ditches taken out, tiling system removed and the Mustinka ditch removed so we would have conditions as existed practically in 1896, you would have had just as much water there as existed in these years?
A. I suppose so.
Q. Well, you think so?
A. Yes sir.
1052 Q. In other words, as far as the ditches were concerned and the tiling systems were concerned and the Mustinka river, it didn't serve in those years to remove any of those flood conditions?
A. I don't think they did, that is during the high crest of the flood.
Q. Or during any of the time that the flood conditions existed?
A. I think I have stated that I believe the river will handle more water and it will bring it quicker to its outlet, that is, as long as the water is confined to its channel.
Q. But you have stated that the years 1914, 1915 and 1916 were wet years and you had considerable flood during those years. Now either the artificial conditions imposed on the natural conditions served to carry that water off quickly or didn't?
A. Now all I can say, it was just as much water in 1914 and 1915 and 1916 as I ever saw.
Q. Now I will ask you to state whether or not those ditches, all of them we have been talking about here, served to carry that water off quicker and in more volume than the natural conditions would?
A. I think these county ditches did.
Q. And the state ditch—did it serve to carry off these waters any quicker and in more volume?

A. The river north of Wheaton was just as wide as it ever was before, and I don't see that it did help conditions very materially, in fact I know it didn't.

Q. In your opinion then, the artificial conditions existing did not serve in the years 1914, 1915 and 1916 to take off that water any more rapidly than it would have done in a state of nature?

A. Now the conditions were there—the river was wide.

1053 Q. Can't you answer that question.

—. I don't know how to answer it because in fact I don't know. I only saw the result of the flood.

Q. I am asking you again—in your opinion—you lived there all those years?

A. Yes sir.

Q. You have seen that country in its natural condition?

A. Yes sir.

Q. You have seen those ditches built, and have seen the two Mustinka ditches built?

A. Yes sir.

Q. Now I ask you whether or not in your opinion in the years 1914, 1915 and 1916, those artificial constructions would take off those waters faster than the natural conditions that you saw there?

A. Yes sir.

Q. Would it or would it not?

A. The water in 1916 was higher than I ever saw it before.

Q. Conceding that it was higher in 1916 than before—would the waters as they existed in 1916 be taken off faster by the artificial ditch constructions, as you have described them here, than the natural conditions as you formerly saw them to exist there.

A. It did out in the town- of Clifton and Redpath where we had the county ditches.

Q. I am asking you again—given a condition as you had existing there in 1916, with so much water—you have told about the condition in 1916—I am talking about one year now—and given the natural condition as you have seen it existing there in 1896, and given the artificial condition as it existed there in 1916, which would take the waters off more quickly and faster, the natural condition

1054 or the artificial condition?

A. Pardon me. I never saw the condition in 1896 of the river from the Milwaukee railroad bridge up towards the Lutheran Church in the town of Monson, Section 23. I didn't see the high water marks in 1896 or 1897.

Q. I don't care anything about the high water mark—nothing about that. I am talking about the natural conditions and the fact of *their* being a river there under natural conditions?

A. Yes sir.

Q. And the fact of these tributaries existing under natural conditions—Five Mile creek and Twelve Mile creek. Now you knew in a state of nature there was the Mustinka river there and you knew Five Mile creek and Twelve Mile creek flowed into it, and now I am asking you to say whether or not in the year 1916, given the condition that did exist in the year 1916, would the natural conditions as

existed in 1896 take off that water quicker or would the artificial conditions take it off quicker and faster?

Mr. Palmer: Objected to as calling for an opinion of the witness on a matter on which no expert opinion can be formed, and the witness having already stated the conditions there in 1896, this question calling for a mere inference from those conditions which can be as well drawn by anyone else as by the witness; and the witness has stated that he doesn't know what the conditions were in a state of nature in the year 1896 below the confluence of the Mustinka and Twelve Mile creek.

A. To be really fair in this matter, I don't believe I am competent to answer that question. I would rather think though, that it would be a stand-off, considering the volume of water we had in the
1055 years 1915 and 1916, because while the channel would take it faster the banks would dam up the flood water that much more.

Q. Have the farms you have been talking about in the delta zone, particularly in Grant county and particularly in Traverse county been benefited and rendered more valuable by the ditch constructions?

A. I consider a ditch an improvement to a farm. It is an asset to a farm and it is valuable.

Q. Well, will you answer the question as to rendering the farms more valuable?

A. Yes, I think so.

Q. Would you say that as a result of this drainage system we have been talking about and you have mentioned in the evidence, including the state, county and judicial ditches, that hundreds of farms have been benefited and thousands of acres of land rendered dry and tillable, beneath the surface of which lands the water table was, during the growing season before such ditching, only a few inches or at most a foot or two?

A. Now I don't know as to that. It has helped the Redpath sloughs, I know it has, and it has helped the land more on the north side of the so-called first section of the Mustinka cut-off than it has on the south side.

Q. Are you prepared, Mr. Ringdahl, to deny the statement made in the answer sworn to by Attorney General Smith of this state that as a result of such drainage hundreds of farms have been benefited and thousands of acres rendered dry and tillable, beneath the surface of which land the water table was, during the growing season before such ditching, only a few inches, or at most a foot or
1056 two?

A. No sir, I wouldn't, because I know it has helped some land north of Wheaton in ordinary seasons, and that is what that refers to.

Q. Now counsel asked you a minute ago on redirect examination about flood waters going over into the Rabbit river, or over into the Tintah slough and in that direction. Have you seen flood waters there in previous years do that?

A. I never saw flood waters go over into the Tintah slough, I only seen the after effects of where the flood waters went acrossed.

Q. You have never been there when they went across?

A. No sir, and I stated so in my direct examination.

Q. And you didn't pretend to testify, either in direct or cross-examination, that you ever saw any flood waters going over into the Rabbit river?

A. No sir.

Q. And you don't know anything about that except what the after-effects disclosed?

A. That is all. I wasn't there in the high stage of the water.

Q. Did I understand you to testify that the channel of the Mustinka river, at the railroad bridge, as rectified, is not any wider than it was formerly?

A. No, it is not, sir.

Q. Not any wider?

A. No, because the railroad bridge is the same there.

Q. It is deeper?

A. Yes sir.

Q. How much deeper?

A. I should judge about four or five feet.

Q. Have you measured it?

1057 A. Yes, but I had no way of telling the excavation except by looking in this book, because when I followed the dredge and measured up they gave me the data as to the line, and also a given point, as I stated before, called the bench marks, and I had to take my instrument to find the surface of the water from the bench mark and then put up a *guage* and then measure the depth of the water and then subtract from the reading of my *guage* the depth of the water, and then it would show me whether they were correct or not.

Q. How deep is the channel there at the railroad bridge?

A. You mean from the level of the prairie?

Q. From the level of the railroad bridge?

A. Down to the bottom—down to the water?

Q. Yes.

A. Now, I couldn't say exactly—somewhere about twelve or fourteen feet.

Q. And how wide is it?

A. About fifty or sixty feet, maybe more and maybe less. I didn't measure it.

Q. When did you measure it last?

A. I haven't measured the railroad bridge.

Q. At any time?

A. No.

Q. You mentioned about some proceedings in the district court to open up some ditch or widen or deepen it. Is that this first state ditch?

A. Yes sir.

Q. Now pending?

A. Yes sir.

Q. Initiated by your board of county commissioners?
A. No sir. It is in district court before Judge Flaherty at Morris, Minnesota.
1058 Q. Brought by whom?
A. By the residents along the ditch, I reckon.
Q. And your Board of County Commissioners interested in the suit?
A. No, it ain't a suit, it is only a petition to the court to order the ditch cleaned out.
Q. Under the judicial ditch proceedings?
A. Yes sir.
Q. Is there any pending project or ditch from Herman to Wheaton, or in that line?
A. There is.
Q. County ditch?
A. That is a judicial ditch.
Q. Pending on petition?
A. Yes sir, pending on petition.
Q. Starting where and ending where?

Mr. Palmer: Objected to as entirely immaterial.

Mr. Palmer: Has this petition been granted or any ditch established whatever?
A. No sir, it has not been granted. The hearing is postponed for another year.
Q. Has the petition been filed?
A. The petition has been filed with the court.
Q. And the engineering features of it that precede the petition have been filed?
A. Yes sir, as far as I know it has.
Q. You know something about it?
A. I was over to a hearing at Morris one time and that is all I know about it.
Q. Concerning the granting of the order?
A. Yes sir.
1059 Q. On the establishment of such and such a judicial ditch, is that correct—you were over at the hearing that came up before the judge?
A. Yes sir.
Q. You have had considerable trouble in your county over drainage proceedings and county ditches before your board?
A. No, not very much.
Q. Did you have anything to do with this action of mandamus to compel the putting in of this extension ditch?
A. No sir.
Q. You were not a party in any way?
A. No sir.
Q. Do you know whether or not some fifteen to seventeen farmers in your county have at at least two sessions of the legislature presented claims for damage to their lands by reason of overflow?
A. I heard about it.

Q. Has it been brought to the attention of your Board of County Commissioners?

A. No sir, not except they have been talking about it.

Q. That would be for damage to lands on this flood plain you are talking about?

A. North of Wheaton along the old channel of the Mustinka river.

Q. And do you know whether or not a claim was presented to the legislature when you were down here?

A. No, I couldn't say, because I heard about that such claims either was presented or was to be presented, but that is the last of it.

Q. In speaking of these lands that you said were under cultivation—so many acres—you meant broken up, I presume?

1060 A. Yes, I meant what is broke. Those figures, as I have stated before, that I gave, are only approximate.

Redirect examination.

By Mr. Palmer:

Q. Mr. Ringdahl, has the state had anything whatever to do with the county ditch proceedings in your county?

Mr. Bronson: Objected to as calling for a conclusion of the witness, a statement of a pure question of law.

A. No sir, not the state.

Q. Has the State Drainage Commission had anything to do with the county ditches in your county, either the establishment or construction?

A. No sir, not to my knowledge—never heard of it.

Q. And has the state of State Drainage Commission had anything to do with the establishment and construction of judicial ditches in your county and the adjoining counties?

A. No sir, not to my knowledge.

Q. Both county and judicial ditch proceedings then are carried on entirely independently of the state of State Drainage Commission?

A. Yes sir, at least we have done that in our county. The name of the State Drainage Commission has never been mentioned in the laying out of our county ditches, nor have the county board anything to do with the judicial ditches, so I am not familiar with conditions in the judicial ditches, you understand.

Q. Judicial ditches are laid out?

A. By the court.

Q. By the judge of the district court?

A. Yes sir.

1061 Recross-examination.

By Mr. Bronson:

Q. Whenever your Board of County Commissioners had anything to do with county ditches you followed the law, as far as you observed it?

A. Yes sir.

Q. Do you pretend to be familiar with all of the provisions of the law applying to drainage matters in this state, both as applicable to state and county ditches?

A. We have the county attorney that gives us advice.

Q. And when you state that the State Drainage Commission or the state never had anything to do with those ditches did you mean to say that there is not any law in this state that gives the State Drainage Commission any authority over county ditches?

A. I wouldn't say that, but I mean as far as influence and things of that kind.

Q. Or do you pretend to say that the State Drainage Commission doesn't have authority to interfere on county ditches if they so desire?

A. I wouldn't say that.

Witness Excused.

AUGUST W. HARTAGE, having been called as a witness on behalf of the defendant, was duly sworn, and testified as follows:

Direct examination.

By Mr. Palmer:

Q. Where do you live, Mr. Hartage?

A. Sisseton, South Dakota.

Q. In what county is that?

1062 A. Roberts county.

Q. Where is Roberts county, South Dakota, with reference to the lands involved in this suit?

A. Roberts county is immediately west of Lake Traverse.

Q. And would you say immediately south of Richland county, North Dakota?

A. Yes sir.

Q. And some of the lands alleged to have been injured as shown upon the area shaded yellow upon Complainant's Exhibit No. 1 are in Roberts county, South Dakota, are they not?

A. Yes sir.

Q. And this Village of White Rock that has been referred to here is in Roberts county, South Dakota?

A. Yes sir.

Q. Is Roberts county, South Dakota and its situation respecting Richland county, North Dakota, and Wilkin, Traverse and Bigstone

Counties, in Minnesota, correctly shown on the map here, Defendant's Exhibit No. 7?

A. Yes sir.

Q. Is Sisseton, the place of your residence in the county of Roberts—is it the county seat of Roberts county, South Dakota?

A. Yes sir.

Q. How long have you resided there?

A. Five years.

Q. What is your occupation?

A. Civil engineer?

Q. Are you a graduate of engineering of any school or college?

A. Yes sir, from the University of Strasburg, Germany.

Q. Have you from that school a degree of civil engineer?

A. Yes sir.

1063 Q. How long since you graduated?

A. 1903.

Q. Have you practiced your profession of civil engineer continually since that time?

A. Ever since, with the exception of about eight or ten months when I first came to this country in 1907.

Q. Where did you live and practice prior to your location at Sisseton, South Dakota?

A. In Chicago, Illinois.

Q. Have you practiced your profession of civil engineer continuously at Sisseton, South Dakota, during the time of your residence there?

A. Yes sir.

Q. Do you hold any official position in your county?

A. I am county surveyor of Roberts county.

Q. How long have you been such?

A. Since 1912, in November.

Q. Does your work as civil engineer and as county surveyor give you special knowledge of drainage of agricultural lands?

A. Yes sir, in a general way.

Q. How far is Sisseton from the drainage area of South Dakota, that is tributary to Lake Traverse—how far and in what direction?

A. Sisseton lies in a southwesterly direction from the closest point of that drainage district about six miles.

Q. Have you had occasion to become familiar with the drainage area in South Dakota that is tributary to Lake Traverse?

A. In so far as the whole district is concerned in regard to Lake Traverse; that is, I didn't measure and find out the watershed which belongs to Lake Traverse.

Q. Have you become familiar with it in a general way?

1064 A. In a general way I have, from government figures that have been sent to me from Washington. I have acquainted myself with the lay of the watershed there.

Q. Are you familiar with the topography of the ground northeasterly from Sisseton?

A. Pretty well.

Q. Been over it?

A. Yes sir.

Q. Worked on it?
A. At numerous times I have been over it.
Q. And worked on it?
A. Yes.
Q. For what purpose?
A. For general surveying and also for draining sloughs, private drains for sloughs.
Q. Have you laid out private drains for farmers upon that area that is tributary to Lake Traverse in Roberts county, South Dakota?
A. Yes sir, I have.
Q. How extensive has been your work in that line upon that area?
A. Of late years—the last two or three years it has been quite extensive in that district there.
Q. And from your knowledge of the locality and of the government surveys would you say that the line marked by the dotted line and showing in blue on this Defendant's Exhibit No. 7 approximately marks the limits of that drainage area so far as Roberts county, South Dakota, is concerned?

Mr. Bronson: Objected to as calling for expert opinion and no foundation laid.

Q. I am asking you only if it is in your opinion approximately correct?
A. I think it is.
1065 Q. Mr. Hartage, are the lands within this drainage area in Roberts county, South Dakota tributary to Lake Traverse agricultural lands?
A. Yes sir.
Q. Have you knowledge of that so you can state whether they are such agricultural lands as need drainage?
A. There is quite a number of sloughs, large ones and big ones. The land itself is rolling and it natural- forms pockets.
Q. What would you say as to the number of these sloughs?
A. They are very numerous in that section of Roberts county.
Q. Does the surface water stand in these sloughs and pockets?
A. Yes, it stands there. It stands for quite a while there to-.
Q. Have you knowledge as to whether those lands in that drainage area have been drained artificially in recent years?
A. You asked if all those lands have been drained?
Q. No, I said those lands?
A. Yes.
Q. Now what will you say as to that drainage in recent years artificially on those lands?
A. The farmers have installed private drains—that is, they drain one slough into the other and the last one they take into a outlet or what they term a natural water course or kind of depression in the ground and then it goes on until it runs into one of those gulches and from there into Lake Traverse. I might say there is a slough up here what we call the Dry-Run, and dry-run goes from Grant Township, as shown on this plat here through Harmon, Hart to Victor. The upper part is called Cottonwood slough or

Cottonwood Lake, and it draws over around to the north of White Rock.

Q. Not north of White Rock, you don't mean?

1066 A. North of Rosholt—and it joins Mud Lake, a part of Traverse Lake.

Q. It goes into Traverse Lake between Mud Lake and what is called Club House Lake?

A. Yes sir.

Q. Those are both parts of Traverse Lake?

A. Yes sir.

Q. Now you state that the northerly portion of that run passes into Lake Traverse between Mud Lake and Club House Lake, coming in from the west and entering the lake by passing easterly —now what of the southern portion of that run?

A. The southern portion of that run goes down to what we call Jim Creek, and strikes the southern part of Lake Traverse. That is, it flows into the southern part of Lake Traverse about three or four miles north of Browns Valley.

Q. And is this Jim Creek the little stream that is indicated on this map in the southwestern portion of Bryant township?

A. Yes sir.

Q. As to the size of this Cottonwood slough or Cottonwood run—how wide is it?

A. It differs. The widest place is pretty close to a mile and narrowing down to probably half a mile.

Q. How deep is it in the prairie?

A. There is not much water in there.

Q. How deep is it in the prairie—below the level of the prairie?

A. I never measured that myself, but there is quite a drop there.

Q. What would you say—about how many feet?

A. At least thirty-five or forty feet, probably more than that.

Q. It has high banks?

1067 A. Yes.

Q. Wooded?

A. Some of it, yes.

Q. How about water standing in it—take this part marked here "Cottonwood Lake?"

A. Cottonwood Lake is filled with water about the way it is shown, but the rest of it in here is dry in ordinary times. At the present time there was some water left there from the floods of 1915 and 1916.

Q. And is this Cottonwood Lake a large lake?

A. Why it is about two or two and a half miles long.

Q. As shown upon the map here?

A. Yes, that is pretty close to it.

Q. And is that a permanent, natural lake? Cottonwood Lake?

A. It always was as far back as the government made the survey, because they showed it on their plats.

Q. Now where has the drainage of these lands been with respect to Cottonwood run?

A. They have been mostly west in Lien Township, also in Minnesota Township, Hart Township and Grant Townships.

Q. The lands in those townships, as I understand you, have been drained easterly into this run?

A. I wouldn't say whether they drained eastwardly. I just drained them to get the water out of the ground, whether it was east or west from where I started. But all those gulches lead over into Dry-run, or Cottonwood run as it is called. I might have taken the ditch westerly until I hit the slough, because the distance there probably was less going west than going east.

Q. But this Cottonwood Run or Dry Run is the outlet for that drainage?

1068 A. Jim creek is the outlet of this Cottonwood run or Cottonwood slough.

Q. Then, as I understand, the drainage of these lands is taken into Cottonwood Run and from there the water reaches Lake Traverse through either Jim Creek at the south or the northerly outlet between Mud Lake and Club House Lake?

A. There is very little going in north of Cottonwood Lake. All the gulches run in a general southeasterly direction and it would be more likely to take it in here than to go around there.

Q. Now take the land easterly of this Cottonwood country, in the Townships of Bryant, Harmon and White Rock, are those drained too?

A. I myself laid out only a few drains in White Rock Township and also in Harmon Township, but not as much as over on the west side of this Cottonwood slough.

Q. And which way do those drains run in White Rock and Harmon?

A. When you are talking about the drains you are talking about these gulches?

Q. Yes.

A. I brought the drains to the gulches and they run in a southeasterly direction.

Q. And directly into the lake?

A. Yes, that is, into Lake Traverse.

Q. In which you include Mud Lake and Club House Lake?

A. Yes, they belong to Traverse Lake.

Q. How many of these private drains do you think you have laid out in that territory, approximately?

A. I couldn't state that off-hand. I have been working practically all this summer right in around that country and I couldn't say for sure; and I was there in 1916, but as to the number

1069 of feet, it is hard for me to tell because I have laid out so many that I don't know.

Q. Could you tell about approximately how many drains—different farmers?

A. Different systems—oh, probably fifteen or twenty different systems or different drains that I have laid out in that district.

Q. Are there natural drains there for carrying off surface waters into Lake Traverse, Mr. Hartage?

A. Yes sir.
Q. What are they?
A. These gulches.
Q. Or ravines?
A. Yes sir.
Q. Running where?
A. Running easterly and southeasterly to the Lake.
Q. How large are those ravines?
A. Some of them are very deep.
Q. And wide?
A. Deep and wide. I never measured them across except by the eye. I should judge some of them run about fifty and probably more feet deep and they are in width some of them two or three or four hundred feet.
Q. Going down from the prairie into the lake?
A. Yes sir.
Q. Does the lake on that side next to Roberts county have high banks until you get up to the vicinity west of the village of White Rock?
A. The bank extends west of White Rock, I don't know how far, but the bank is very well defined and high until you get to the state line.
Q. How many of these gulches and ravines running down to the lake are there, by which I don't expect you to give me the
1070 number, but whether there are only a few or are they numerous?
A. They are numerous.
Q. And the sloughs and pot-holes you have spoken of in the lands themselves there, are they few or numerous?
A. They are numerous. Of course some of them are small and some of them are large. Some of them take in probably two or three acres, and some of them take in twenty, twenty-five and up to forty acres in area, and the water in them is a average of two and a half to four feet. That is, those that I have drained.
Q. You mean in a natural condition the water was that deep in them?
A. Yes sir.
Q. And does the water remain in there?
A. The water will go off slowly if you don't touch it, but the farmers installed or begun to install these draining systems to take the water off quicker. They wanted to get the water off the land.
Q. I suppose in a natural state the water evaporates or seeps into the ground, practically all of it?
A. The water usually did seep into the ground, practically all of it.
Q. How long under natural conditions does it remain on the land?
A. At the present time where the ground is pretty well soaked through a small rain will keep the water on there for quite a while.
Q. Long enough to destroy the crops?
A. Yes. It only takes two days to destroy the crops.
Q. And you say these drainage systems have been put in for the

purpose of taking the water off quickly enough so it won't injure the crops?

1071 A. Yes sir.

Q. What are those artificial drainage systems that have been put in, open ditches or tile?

A. Mostly tile. Two or three of them have taken a plow and opened up a slough to let the water run.

Q. And in the last two or three years how extensive have been these tiling operations in that area?

A. Well, you might say that it practically started about two or three years ago.

Q. And I ask you how extensive it has been carried on since?

A. I had quite a bit of work in there doing that, establishing or installing tile ditches and other ditches, and beside that there were other ditches laid out, not by me, but by someone else. I can say that they have recently established two tile factories right in that district, one in New Effington and one at Claire City.

Mr. Bronson: Objected to as immaterial, and move to strike it out.

Q. Two tile factories?

A. Yes sir.

Q. How extensive is the business of those tile factories?

Mr. Bronson: Objected to as immaterial, not within the issues, incompetent, not within the knowledge of the witness.

Q. Whether it is large or small?

A. Well from what I heard—what these owners of these factories have told me, they had made good: they had a good business.

Mr. Bronson: Move to strike out the answer as based on hearsay testimony and simply encumbering the record.

Q. Well, now in a general way, how many of those farms in this area tributary to Lake Traverse have had these tiling systems put in on them in the last two or three years, Mr. Hartage? Can

1072 you give us some idea—about one out of five?

A. Of course, some neighbors, when I started for one fellow, all the rest of the adjoining fellows had it put in and installed their drains at the same time, but whether it was one out of five or one out of ten, I couldn't say as to that. I don't know.

Q. Are these tiling operations going on all the time in this area?

A. Yes.

Q. Do you know the nature of their soil in these agricultural lands upon this area, something of it?

A. In a general way I do.

Q. Just state?

A. You mean the geological condition.

Q. The formation of it as you observed it?

A. We have from one and a half to four feet of black soil in that district there, and underneath that is clay and sand formation. How deep that is, I don't know.

Q. What is the tendency of that soil to absorb water by seepage?

A. Water will go through the black soil readily enough, but when it comes to the clay it will stand there and go through it very slowly, and that is the reason we open this clay formation up to let the water out quicker and give it a chance to run.

Q. By means of the tile?

A. Yes.

Q. And in that way are the lands substantially benefited and improved by this tiling?

A. Yes, the tile will take the water away quicker, water that has been standing on there, but after that it will be — gradually again. The water will be going gradually from the land. Of course

1073 when you open up a slough the water will rush right down.

Q. And I take it the purpose of the tiling is to get the water away quickly and much more so than it would go in a state of nature?

A. Yes sir.

Q. Now the nature of the surface of the lands in this area in South Dakota you say is rolling?

A. Yes sir.

Q. And with the slope toward the Lake?

A. With a southeasterly slope toward the lake right in that district there.

Q. What would you say as to the rapidity with which the water runs off of the lands over in that area as compared with those on the Minnesota side?

A. Why, I should think that on the South Dakota side is more rapid than on the Minnesota side, Minnesota being more flat than South Dakota.

Q. Do you remember about the conditions of that area in the year 1916 as to whether the lands were wet or dry last year?

A. Almost all the lands were wet. We had a very wet season and the lands were very wet last year. That was 1916.

Q. How about the crop of that area?

A. I am not a farmer, and I don't know about the crop—from what I heard it wasn't good.

Q. On account of what?

A. On account of the water.

Q. Is there any other natural avenue of drainage for these lands than this drainage area in Roberts county, South Dakota, except into Lake Traverse?

A. Not that I know of.

Q. Have you examined the lands on the Minnesota side,

1074 Mr. Hartage, so that you can compare the necessity for drainage on the Minnesota side with the necessity for drainage on the South Dakota side?

A. I have not examined for that purpose, no, but I have been over the lands and seen what they look like.

Q. What would you say?

A. Minnesota needs the drainage more than South Dakota.

Q. Why?

A. Because it is more flat. South Dakota in time would get rid of its water.

Q. South Dakota has more provision made for the drainage by nature?
A. Yes sir.
Q. Mr. Hartage, did you in the year 1915, in the summer of 1915, take some levels of the water surface in the part of Lake Traverse which is at the source of the Bois de Sioux river, and also some levels of the water surface through the territory in Dakota alleged to be injured here to the mouth of the Rabbit River?
A. Yes sir.
Q. Have you those levels with you?
A. Yes sir.
Q. Your field book?
A. Yes sir.
Q. How did you take those elevations, Mr. Hartage, in a boat or from the land?
A. From the land.
Q. Did you go out in a boat to take the water surface?
A. Well, I got them on shore, but I went out in the boat to find out, if I could, how deep the deepest place of that region of the lake was.

Q. On what date did you take these levels?
1075 A. In July, 1915, from July 2nd to July 9th.
Q. That was at the time of the summer flood?
A. Yes sir.
Q. Now will you give me the water surface where you first took it?
A. I took the water surface at a point about five miles south of White Rock on the east shore of Lake Traverse.
Q. That was the first level you took?
A. Yes sir.
Q. What was that?
A. I assumed an elevation of 100.
Q. And at the mouth of the Rabbit river did you take an elevation?
A. Yes sir, the water surface there was 90.7.
Q. The same day?
A. No, it wasn't the same day.
Q. What date did you take it there?
A. That was on the 8th.
Q. So what was the slope of the water surface at that time between those two points?
A. 9.3 feet.

Mr. Bronson: What date did you take the water surface five miles south of White Rock?
A. July 2nd.
Q. And the other July 8th?
A. Yes sir.

By Mr. Palmer:

Q. Did you pass along the Bois de Sioux channel from the point where you took this first elevation up to the mouth of the Rabbit river?

A. Not entirely. I passed along the shore as near as I
1076 could to the Bois de Sioux and whenever it was convenient I ran over to the Bois de Sioux.

Q. *Whereever* it was accessible, you mean?

A. In general I didn't pay any attention to the water at all because I was only required to find out the fall between the two points.

Q. Did you observe the condition of the channel of the Bois de Sioux between the points where you took this elevation?

A. Yes sir, I took a boat and spent about a day, after I was through surveying, and found out or tried to find out what was the cause of the obstruction. After I seen what fall it had I wondered why the water didn't go out, and I took a boat and went about five miles south through the Bois de Sioux up to probably six or seven miles north of White Rock.

Q. To find out the cause of——

A. Why the water didn't run.

Q. As I understand you, finding this amount of fall you——

A. I wondered why the water didn't go away quicker than what it did.

Q. So you took a boat and explored the channel to find out?

A. Yes.

Q. Did you find out what was the cause of the water not running off?

A. Well, if that is the whole cause, I don't know, but it certainly helped to obstruct the water. In the first place, it was grown with weeds so thick you could hardly get through. The weeds were very high and thick and there was two places where I found what you might call a kind of crossing through the channel; what I think
maybe some farmer had at lower water stage probably put
1077 some private crossing in there to get through. There was stone and manure and grass and hay and weeds cut off and thrown in there.

Q. Were these crossings of stone, manure, weeds and hay right across the main channel of the Bois de Sioux?

A. As far as I could find the main channel they were, but you remember it is pretty hard to find that Bois de Sioux channel.

Q. The main channel is pretty well on the easterly side of the valley?

A. Yes sir.

Q. And there is where you found these?

A. Yes sir.

Q. Did they extend clear across the natural channel apparently?

A. It seem to me so.

Q. Were there any bridges in at these points?

A. Not at these points, no, but there *is* bridges over the channel all right.

Q. At other points where the highways cross?

A. Yes sir.

Q. But not at these private crossings?

A. No, there was no bridge in there.

Q. Any provision or opening made for the flow of the water through these openings?

A. Of course, the water had taken some of that hay down that they had down in there, where it had been destroyed by the water. I found traces of where the crossings had been put in, but I don't suppose they are now as plain as they were when they were put in there.

Q. Well, you mean that they were not at the time you found them perhaps just as they were put in?

A. Yes, that the water had taken off some of that dirt most likely.

1078 Q. Now how many of these private crossings acrossed the channel did you find?

A. Two.

Q. Where were they?

A. I cannot give the exact location at that time. I think the first one was about four miles or three and a half north of White Rock, and another one probably two miles beyond that.

Q. And were there highways or road crossings leading down to where these crossings were put in from the east and west?

A. That I don't know. Of course roads down there aren't very well-defined, and it might easily have been a private farm road. I don't know.

Q. Now did you observe whether these obstructions acrossed the channel and had dammed the water up?

A. That is hard to tell because the water was standing on top of them and you couldn't. Of course they probably helped to dam up the first part of the water. I suppose it will stop the flow over the ground.

Q. Now there has been described here a road passing east and west clear acrossed the valley at White Rock, which is called, I believe, the White Rock road. Did you observe that at that time?

A. Yes sir.

Q. Did you observe particularly as to whether that road dammed the water up and prevented its flow?

A. I think it did because the water was somewhat higher on the south side than it was on the north side of the road so it must have dammed the water.

Q. Had the water been running over the road?

A. Yes.

Q. At how many points?

1079 A. That I couldn't tell.

Q. Was it running over the road when you were there?

A. There was only on one point then.

Q. It was running over at one point?

A. Yes, it was close to the bridge.

Q. Close to what bridge?

A. Close to the second bridge in that distance from White Rock west to the bluff.

Q. Where was the main channel—what direction from White Rock?

A. The main channel on the west side?
Q. No, the main channel?
A. On the east side of White Rock, that is, of the Bois de Sioux.
Q. And this point where it was running over the road was, you say, the second bridge westerly from White Rock?
A. Yes, that is the road you refer to, don't you?
Q. Did these obstructions acrossed the channel to your mind account for the water not passing off from that area as rapidly as it ought to with the fall that there was there?
A. It certainly helped to stop it.

Cross-examination.

By Mr. Bronson:

Q. How many days were you down there on the Bois de Sioux river, Mr. Hartage?
A. From the 2nd to the 9th I worked.
Q. Seven days?
A. There was one Sunday in there in that time.
Q. Eight days all together in July, 1915?
A. Yes sir.
Q. Is that the only time you have been down there?
A. You asked how long I was on that work. That is the
1080 only time I was on that particular work.
Q. Were you down there at any other time?
A. Yes sir.
Q. When?
A. I have been in White Rock frequently.
Q. In 1915?
A. 1915, 1916 and 1914. Ever since I came down there. I was county surveyor.
Q. You have seen high water conditions existing in the town of White Rock in 1915 and 1916?
A. Yes sir.
Q. Were you there in April, 1916, or May, 1916?
A. I don't know what month it was.
Q. Were you there, as you recollect it, when the water was high in 1916?
A. In White Rock?
Q. Yes sir.
A. Yes. They said it was pretty high, the highest they had seen it.
Q. Well, you saw it?
A. Yes.
Q. Now, when you went down in July, 1915, on this territory in the Red River valley where the Bois de Sioux runs through the water was high?
A. Yes.
Q. Outside of its banks?
A. Yes sir.
Q. And the stream—you observed it to be how wide in some places?

A. It is hard for me to tell, because I didn't go over on the west side, but a fellow could see about—it was in some places a
1081 mile.

Q. That is the water spread over the farms from White Rock on the south up north towards the Rabbit River?

A. Yes sir.

Q. And the water spread on the west side of the Bois de Sioux channel as well as on the east side of the Bois de Sioux channel?

A. Yes sir.

Q. And about how deep was it along in the middle?

A. It didn't run very regular. The depth of the water didn't run very regular.

Q. On the farm lands a foot or two feet, or about what?

A. In some places it was deeper than that. Some places it was a foot and others three feet.

Q. On the farms?

A. Yes sir.

Q. So that as you went down in July along the Bois de Sioux the waters of the Bois de Sioux were outside of their channel in this district from White Rock up towards the Rabbit river?

A. Yes sir.

Q. In other words, the flood waters as they came from Lake Traverse had overspread the surrounding lands adjacent to the Bois de Sioux river, going northward, and such waters were outside of the banks?

A. Yes sir.

Q. Of the Bois de Sioux river?

A. Yes sir.

Q. So in traversing that territory with a boat that time it was difficult to determine where the banks of the river were from actual observation of the surface?

1082 A. Yes sir, on the surface, you couldn't.

Q. And the only way you could tell would be by making some soundings?

A. Yes sir.

Q. And that was the only way too, was it not?

A. To some extent, yes.

Q. Now counsel had asked you about taking an elevation up about, I presume, where Lake Traverse starts in its outlet of waters into the Bois de Sioux?

A. Yes sir.

Q. And did you determine that point when the waters were high, in July, 1915, or did you determine it at a subsequent time when the waters were lower?

A. No, I determined that point—that is, I took that point on the 2nd of July.

Q. On the shore of the lake or in the water?

A. I took the water level—it comes up on the shore. Then I went out in the channel of the Bois de Sioux river and found the deepest place.

Q. At that time the channel of the Bois de Sioux river was overflooded?

A. Yes.

Q. The whole surrounding country was overflooded?
A. Yes sir.
Q. So you had, in a way, to make a guess as to where the Bois de Sioux channel was, did you not?
A. Yes sir.
Q. Now did you take an elevation above the sea level?
A. I didn't refer to sea level.
Q. How did you make your assumption of 100?
A. For my purposes that assumption was good enough as I only wanted to get the relative height of the two points.
1083 Q. What level did you take there?
A. I assumed the water surface at that date to be a hundred, then I went in, because I couldn't send my men in there, so I took a boat and went in on that same day and got the depth of the water.
Q. Where?
A. The deepest place of it right opposite from this point.
Q. This point south of White Rock?
A. Yes sir.
Q. You got the depth of the water?
A. Yes sir.
Q. What was the depth of the water you got?
A. Four feet and a half was the deepest I got there.
Q. That is on July 2nd?
A. Yes sir.
Q. 1915?
A. Yes sir.
Q. Then what did you do?
A. Then I ran my levels on dry ground.
Q. Based on the four and a half foot depth?
A. Yes sir.
Q. From the point on the shore?
A. Yes sir.
Q. Did you stake the point on the shore?
A. Yes sir.
Q. Stake there yet?
A. Yes sir, I believe so.
Q. What kind?
A. Wooden stake.
Q. Any mark on it?
A. No.
Q. And then stake you say is about four miles——?
1084 A. About five miles south.
Q. Can you give me the location of the stake?
A. It is at the fence corner south of John Oscarson's farm between Larson's and a man by the name of Werner that was renting that quarter—I don't know the name of the owner.
Q. That is in Minnesota?
A. Yes sir.
Q. Then you ran levels down to where the Rabbit river flows into the Bois de Sioux?
A. I ran levels down to Wahpeton.

Q. Then did you run levels back from Wahpeton to where the Rabbit river flows into the Bois de Sioux?

A. I passed that in going to Wahpeton.

Q. Yes, but you have stated here that the difference in the level was 9.3 feet between those points, that is, the point five miles south of White Rock and where the Rabbit River flows into the Bois de Sioux?

A. Yes sir.

Q. On different dates?

A. Yes sir.

Q. Now did you take a level where the Rabbit River flows into the Bois de Sioux?

A. Yes sir.

Q. Whereabouts there?

A. Right by the bridge.

Q. The bridge north?

A. North of the Rabbit River.

Q. About how far north?

A. Well, that bridge is right at the confluence of the Rabbit River with the Bois de Sioux.

Q. A little north?

A. Very little. The water there was 6.8 feet deep, so that
1085 without having a *guage* I have the ground connected with the two points.

Q. You didn't consider the elevations at all?

A. No, I kept my levels right straight through. I wanted to get the fall of the land. I didn't care much about the water.

Q. You don't know whether the water was higher or lower on July 8th than it was on July 2nd?

A. No, I don't know.

Q. Counsel has asked you about the roadway leading across east and west by White Rock. That in some places was flooded as you observed it then?

A. Yes sir.

Q. On Complainant's Exhibit 1—this is a replica of that—at White Rock this territory is shaded yellow—was it appreciably of that extent in 1915 when you saw it, in width?

A. That is pretty near correct as far as I can remember.

Q. There is a road leading east and west by White Rock?

A. Yes.

Q. And that road you say in some places had water flowing through it?

A. Yes sir.

Q. And the water you saw to the south and to the north?

A. Yes sir.

Q. Now if that road had not been there the water in that flood stage would have flowed more freely?

A. I think it would.

Q. And if the Milwaukee Railroad Tracks had not been there at that time the water would have flowed more freely?

A. I think so.

1086 Q. And if the town of White Rock had not been there at that time the water would have flowed more freely?

A. I think it would, most likely.
Q. You saw the water around White Rock at that time?
A. Yes sir.
Q. The flood conditions existing at White Rock at that time?
A. Yes sir.
Q. At that time the current was northward in the Bois de Sioux river?
A. It was northward, yes sir.
Q. Was Lake Traverse high or low at that time?
A. It was high.
Q. In a flooded condition, was it?
A. Yes sir.
Q. And the flood waters were coming from Lake Traverse were they not, these flood waters at that time?
A. Yes sir.
Q. And you could see at that time that the flood waters were flooding around White Rock and all this territory to the north on both sides of the Bois de Sioux river?
A. It seemed to me so.
Q. Were the highways in this Red River Valley on both sides of the Bois de Sioux up towards the Rabbit river overflowed?
A. Yes, they were.
Q. You have been in this Red River valley on each side of the Bois de Sioux at times when there wasn't high water there?
A. Yes sir.
Q. And you have seen roads going east and west acrossed there?
A. Yes.
Q. And in 1915 you say those roads were flooded and the waters were over them?
A. I wouldn't say the whole of the road, but part of the
1087 road. Anyway you couldn't get through with a wagon or car.
Q. You saw them using boats to go east and west, did you not?
A. They used boats but—yes, they used boats all right.
Q. You saw the water around the elevator at Blackmere, didn't you?
A. Yes sir.
Q. And as you got up toward the Rabbit river you saw a high bridge there?
A. Yes sir.
Q. Did you take any level there?
A. Not except for my own information. I wanted to know what the bottom of the Rabbit river was.
Q. Can you give a relative drop at the high bridge as compared with the assumption that you took of 100 above White Rock?
A. No.
Q. The only two relative points you took of this flooded territory was the point south of White Rock and the point at this bridge near the Rabbit river?
A. Yes sir.
Q. You hadn't been along this Bois de Sioux river previous in that year, had you?

A. No sir.
Q. You hadn't been there when the water started to come up that spring?
A. No sir.
Q. You don't know what occasioned the obstructions in the channel, if there were any, whether they floated in there or how they got there?
A. No sir.
Q. You came to this country in 1907?
A. Yes sir.
Q. From Strasburg, Germany?
1088 A. Why, my home was Saubern, Germany.
Q. And you came out to South Dakota in 1912?
A. Yes sir.
Q. And have resided in Roberts county since 1912?
A. Yes sir.
Q. And you have been a civil engineer there something——
A. In this country you mean?
Q. No, in Roberts county?
A. In Roberts County since 1912. In November, I was elected county surveyor. You asked me if I was civil engineer?
Q. Yes.
A. I was civil engineer before I came to Roberts County.
Q. And you have been County Surveyor of Roberts County since 1912?
A. Yes sir.
Q. You have referred somewhat to this territory in Roberts County, South Dakota, and to a map marked Defendant's Exhibit 7. Have you yourself made any contours or map of the drainage area in that district?
A. No sir.
Q. In referring to this map you simply state offhand from general observation?
A. I state from general observation, and I had occasion to have the government map.
Q. That is the United States Geological Survey?
A. Yes sir.
Q. Some of this territory is quadrangled down here?
A. Yes, we have this White Rock quadrangle.
Q. Any others besides that?
A. I have all of them—White Rock, New Effington, Wheaton, Peever, and Beardsley quadrangles.
1089 Q. Now generally speaking, the territory west of Lake Traverse, Mud Lake and Club House Lake—which is all a part of Lake Traverse is it not?
A. Yes sir.
Q. Is rolling land?
A. Yes sir.
Q. Rising to an elevation as high some places as 1,100 and upwards?
A. Yes sir.

Q. And in a state of nature this territory west of Lake Traverse was quite fairly well drained, generally speaking, into Lake Traverse and these other outlets that you have mentioned?

A. Yes sir.

Q. In other words, the territory as compared with Minnesota, the territory in South Dakota is much better drained by nature than that in Minnesota, in Traverse county?

A. Yes sir.

Q. In other words, the natural drainage is such in this territory you have been describing that as far as it is tributary to these lakes the elevation is such that waters run off freely and fairly rapidly into Lake Traverse and these other tributaries?

A. More so than in this state.

Q. Much more so, is that not a fact?

A. Yes.

Q. In other words, as compared with Traverse County, Minnesota, and Roberts county, South Dakota, the need of artificial drainage projects of Minnesota is at once apparent to an engineer?

A. Yes sir.

1090 Q. Now you speak of Roberts county, South Dakota, having many natural gulches that lead down, I presume from the higher lands down toward Lake Traverse?

A. Yes sir.

Q. They have existed there naturally for years and years and years, from apparent conditions?

A. Yes sir.

Q. And these gulches in a state of nature serve to drain those lands, if I understand your testimony correctly, except such portions thereof as might be termed pot-holes or depressions in the land which, in agricultural operations, might need some artificial drainage?

A. Yes sir.

Q. And with those exceptions the natural drainage of this portion of Roberts county which you have been talking about, and which is the territory tributary to Lake Traverse went naturally and freely into Lake Traverse and its tributaries?

A. Yes sir.

Q. And this Cottonwood slough and Cottonwood Lake were natural reservoirs, were they not put there by nature?

A. I presume so.

Q. They had every indication of it when you saw it?

A. Yes sir.

Q. Weren't put there by the hand of man as far as you could see?

A. No sir.

Q. And adjoining this slough and this Cottonwood Lake that you have mentioned here the land on either side is rolling more or less?

A. Yes sir, the land is rolling more or less all over this territory here.

1091 Q. And by nature on both sides drains into this slough and lake?

A. Yes sir.

Q. Is there some drainage in this Roberts county that goes down into Bigstone Lake?

A. Yes sir.
Q. And through what tributary of Bigstone Lake?
A. What they call the Little Minnesota.
Q. A river?
A. Yes, a fair sized river.
Q. And where does it come into Roberts county?
A. Goes down through Browns Valley.
Q. What part of Roberts County does it traverse?
A. The western part of Roberts county.
Q. And how much of Roberts county, generally speaking, is tributary to it as a watershed?
A. The Little Minnesota runs way up pretty near up to Webbland.
Q. To what extent are any of these townships shown on this map in Roberts county tributary as a watershed to this Little Minnesota?
A. The western half of Minnesota Township is supposed to run in there into the Little Minnesota, and some of Enterprise, and some of Grant Township, and all of Sisseton Township, practically.
Q. You haven't done any public ditching down there?
A. No sir.
Q. That is state, county or judicial, or anything of that sort?
A. South Dakota didn't have any law until the last session of the legislature to permit public ditching.
Q. You have done some private draining?
A. Yes sir.
Q. Mostly tiling?
A. Yes sir.
1092 Q. And most of that has been done this year?
A. Well, last year and this year.
Q. Last summer, 1916?
A. 1915 it started.
Q. And some in 1916?
A. Yes sir, and some this year.
Q. How much have you done in 1916 and 1917 compared with 1915?
A. Well, that is hard to tell without my books. I can hardly tell how much of it.
Q. It has been 1915, 1916 and 1917 that you have been doing this work?
A. Yes sir.
Q. When did you start in, in 1915?
A. The farmers began right after the flood, after the heavy rains they began to ditch, after the spring floods and the heavy rains.
Q. That would be the summer of 1915?
A. Yes sir.
Q. And in the year 1916?
A. As soon as the weather opened in the spring we started tiling.
Q. And been doing some this year?
A. Yes sir.
Q. Now the different private drains you constructed in here, Mr. Hartage, have been largely in what territory?
A. Largely in Lien township, Hart township and also in White

Rock and Harmon Townships, but this side wasn't quite as extensive as in here.

Q. And these private drains, so far as you constructed any at all for individual farmers have led into different gulches that run down into these reservoirs of the Cottonwood lake and slough?

1093 A. Yes, sir.

Q. And this consists in laying the tile in the ground and sometimes little open ditches?

A. Yes sir, and sometimes a farmer will take a plow and just plow probably two feet down and get the soil out of that, and most of them have some natural drains on the farm.

Q. And this would be connecting up by the tiling system some of the depressions or pot-holes into natural drains that existed on the farms?

A. Yes sir.

Q. In 1915 you saw crops harvested in Roberts county?

A. Yes sir.

Q. Did you see any lands flooded in Roberts county that year like they were in the Bois de Sioux valley?

A. Outside of that area we had none—no such thing as a flood.

Q. Or conditions of that kind?

A. No.

Q. Your land is high here?

A. Yes sir.

Q. The water flows off?

A. Yes sir.

Q. You say 1916 was a wet season?

A. Yes sir.

Q. And the crop, as you heard, wasn't good?

A. No.

Q. Did they have rust there that year?

A. That I don't know.

Q. Don't know anything about rust?

A. No.

Q. Do you know anything about the crop yields in 1916 in your county except such as has been told you?

A. That is the only thing I know, what I heard.

1094 Redirect examination.

By Mr. Palmer:

Q. Did I understand you to say that you have in South Dakota a law for the establishment and construction of public and drainage ditches now?

A. Yes sir, we have a law.

Q. Are you familiar with the Minnesota law on that subject to some extent?

A. Oh, in a general way. I am not a lawyer though.

Q. Is the drainage law which you have in South Dakota in its general provisions similar to that in Minnesota?

Mr. Bronson: Objected to as calling for a conclusion of the witness, and merely encumbering the record.

A. I understand the Minnesota law has been taken as a pattern.

Mr. Bronson: Move to strike out the answer as mere hearsay and a conclusion, simply encumbering the record.

Q. Were you employed to do this surveying that you did in July, 1915, in this Bois de Sioux valley?
A. Yes sir.
Q. By whom were you employed?
A. By Mr. S. E. Oscarson of White Rock.

Mr. Bronson: Objected to as immaterial and move to strike it out, as far as North Dakota is concerned.

Q. What was the purpose of your work there, Mr. Hartage?
A. I was supposed to find the fall of the ground from south of White Rock five miles to Wahpeton.
Q. And what was your information as to the purpose of that?

Mr. Bronson: Objected to as calling for mere hearsay evidence, wholly immaterial, simply encumbering the record, not asking for even hearsay testimony from any specific individual.

1095 Q. What was the purpose of it?

Mr. Bronson: Same objection.

A. To lower the level of Lake Traverse.

Mr. Bronson: Move to strike it out for the same reason.

Q. Purposed to dredge the Bois de Sioux in order to lower the level of Lake Traverse?

Mr. Bronson: Same objection, no bearing on this case, calls for mere conclusion, based on hearsay evidence, and simply encumbering the record, and complainant at this time gives notice to the court of a motion that the encumbering of the record be considered in the assessment of costs that flow by reason thereof.

A. Yes sir.

Recross-examination.

By Mr. Bronson:

Q. You don't pretend to know anything about the Minnesota drainage laws?
A. In a general way.
Q. You are not a lawyer?
A. No sir.
Q. You haven't operated under the South Dakota law, have you?
A. Yes sir, I have.

Q. You don't pretend to draw any legal comparisons between the South Dakota and Minnesota law?
A. No, that is only from what I heard.
Q. It is all hearsay?
A. Yes sir.

(Adjournment taken until September 29, 1917, at 10 A. M.)

1096 September 29th, 1917.

Hearing resumed with all parties present. 10 a. m.

EMANUEL HAWKINSON, having been called as a witness on behalf of the defendant, was duly sworn and testified as follows:

Direct examination.

By Mr. Palmer:

Q. Where do you live?
A. Town of Redpath, Traverse county.
Q. Your post office address is Wheaton?
A. Yes sir.
Q. What section of the town of Redpath, in Traverse county, do you reside?
A. Section 18.
Q. And the part of the section on which you live?
A. It is in the Northwest quarter.
Q. How long have you resided there?
A. Most of the time since 1878.
Q. How old are you?
A. 47.
Q. How old were you when you moved upon this land in Section 18 of Redpath township?
A. Eight years in the spring.
Q. Your parents moved there and established their family home?
A. Yes sir.
Q. And did that continue to be the family home thereafter and is it now your own home?
A. Yes sir, it belongs to my father's estate.
Q. But you are living upon it and farming it?
A. Yes sir.

Q. When did your father die?
1097 A. In 1885.
Q. Is your mother still living?
A. Yes sir.
Q. With you upon the farm?
A. No, not now. A few years she has lived in the village of Wheaton.
Q. How large a farm is this family homestead?
A. It is half a section.

Q. And has it always been that extent?
A. Yes sir.
Q. Whether your father filed on it as a government homestead?
A. Well, part of it he filed on as a homestead and then the law was changed so he changed it some way so he got a quarter as a tree-claim and the other he converted into a homestead. It was eighty acres that he filed on originally as a homestead, I guess.
Q. Has this farm always been cultivated and worked since 1878, Mr. Hawkinson?
A. Yes sir.
Q. Your father gained his livelihood and that of his family from this farm?
A. Yes sir.
Q. When your father moved into the country there what was the condition of the country as to settlement?
A. It wasn't settled.
Q. Can you state something about how many settlers there were in that section of the country when your father moved there?
A. Well, there were none there when we came. My father and two other families moved in there at the same time.
Q. They were the earliest settlers?
A. Yes sir, that is in that neighborhood.
Q. After 1878, what was the progress, if any, in the set-
1098 tlement of that section of the country?
A. Well the land was being—the then government land was being taken up very rapidly, and within a couple of years it seemed to me it was all settled and brought under cultivation as fast as they could.
Q. You mean a few years when you say a couple of years?
A. It was taken up pretty rapidly.
Q. You didn't mean two years by saying a couple?
A. Well, it was a very few years. It wasn't very much left there in a couple years.
Q. And the lands as they were taken up were they moved upon by the homesteaders and improvements begun?
A. Yes sir.
Q. Cultivation begun?
A. Yes sir.
Q. Have you looked over this map, Complainant's Exhibit 1, so as to know what territory is included within the area of this map, that is colored light blue, and has been described by Mr. Ralph and the other witnesses as a delta zone?
A. I think I do.
Q. As far back as your recollection extends, Mr. Hawkinson, what was the general condition of those lands which he has marked and described here as a delta zone as compared with the other lands in what became Traverse county?
A. It seemed about the same general nature—a little lower probably.
Q. What portions were lower?
A. Well, there is especially in the Redpath—what has been termed the Redpath sloughs.

Q. What sections?

A. Section- 21, 22, 23, part of 15 and 16.

1099 Q. About how much is the total area of this so-called Redpath slough?

A. Four sections, probably.

Q. Would you say not to exceed four sections in extent?

A. Somewhere about there, I should judge.

Q. Now this area which you call the Redpath sloughs and which you say consisted of about four sections, what was the condition of those lands back as far as you can remember?

A. Pretty much the same as they are now it seems.

Q. And what is that condition?

A. Well, they are a little lower than most of the land around there, but they are used for the same purpose.

Q. What purpose?

A. Pasture and Hay, and some is cultivated.

Q. What has been the condition of that land in the Redpath sloughs as to water standing on it?

A. Well, in times of flood they have been covered.

Q. How long would the water remain there?

A. I don't know, from a few days to probably a couple of weeks, two weeks.

Q. Were there any other sloughs in that area?

A. Well, there is the Tintah slough.

Q. Where is that?

A. That is in Taylor and Tintah townships, on the line I guess between Taylor and Tintah townships.

Q. Will you describe it by the sections?

A. I don't know as I can do that. I believe the souther- portion of it goes somewhat into Section 1 in Monson Township, and takes in a part of Section 36 in east part of Taylor, and the Sections farther down I couldn't mention without looking at the map.

1100 Q. Just kindly refer to the map, Complainant's Exhibit 1—you have mentioned Section 1 of Monson, Section 36 of East Taylor——

A. It would be 30 in Tintah Township.

Q. About how much in extent was that Tintah slough?

A. Must be about four sections also.

Q. What was the condition of that land—that Tintah slough?

A. Well, I guess that is pretty low. I have an idea that was a lower and wetter slough than the Redpath sloughs.

Q. That was your observation of it?

A. I think so, yes.

Q. Have you had during your residence there an opportunity to observe the condition of the lands particularly in these Redpath sloughs?

A. Yes, I have.

Q. You done some work there?

A. I made hay there for a number of years, and traveled through there.

Q. Now aside from those lands comprised in the Redpath sloughs

and the Tintah slough what other lands in this so-called delta zone were low or swampy?

A. Well, I don't know as any of it was very swampy. Probably farther south between—well, it would extend east somewhat too from the Redpath slough.

Q. Well, what was the condition of that land east from the Redpath sloughs as to whether it was low?

A. Well, it was somewhat lower than the land to the south and north from that, but it was somewhat like the—it seemed to be somewhat like the sloughs.

Q. Extending perhaps somewhat slightly over into Grant county?

A. Somewhat.

1101 Q. How much in area?

A. Maybe a mile or a mile and a half.

Q. Now aside from that and the sloughs was there any of that land in this so-called delta zone that was wet or subject to overflow, Mr. Hawkinson, as far back as you can remember?

A. I don't think so. I didn't hear of any. I wasn't around to see any flood conditions in other places right during the floods that we had except in the Redpath sloughs and along the creeks there.

Q. Well, as to the settlement of these lands in this so-called Delta zone, when were these settled?

A. Well, they were settled up shortly after we came—within a few years all around except those sections in the slough.

Q. Settlers remained there?

A. Yes.

Q. On those lands that they took up?

A. Yes sir.

Q. Cultivated them?

A. Yes sir.

Q. Gained their livelihood from them?

A. Yes sir.

Q. And they have continued to be improved after that the same as the other farms in that territory?

A. Yes sir.

Q. Up to well, say the year 1896—you would be how old at that time?

A. Twenty-six.

Q. What can you say of the settlement generally, the condition of settlement of these lands in this so-called Delta zone area?

A. Well, most of the original settlers were there and tilled

1102 their lands.

Q. Did they have buildings upon them?

A. Yes, they continued to improve and build up.

Q. Raise crops?

A. Yes.

Q. What was the nature of the crops raised during the years preceding 1896 upon this so-called Delta zone?

A. A good deal like they are now. Some years they had good crops and other years they weren't so good. Always some crop every year.

Q. How did the crops raised there compare with the crops in the surrounding lands?

A. Pretty much the same, it seems to me.

Q. How many settlers do you think there were upon this so-called Delta area up to the year 1896? About how many?

A. Well, I never counted up.

Q. Mr. Ringdahl has given here something like 125 or 130?

A. Well, there must have been that many because—of course I wouldn't know so well except in the township where I resided and do live now. I could go over that and make a pretty correct list of how many there were there, but outside of for instance in Clifton and adjoining townships I couldn't say.

Q. Did you hear the names which he gave of the settlers in the town of Redpath?

A. Yes.

Q. At the date of 1896 and years prior?

A. Yes.

Q. And without going all over them in detail was the statement which he gave correct?

A. Yes, as far as I followed it up.

1103 Q. Did you follow it all through?

A. All the names he mentioned, I know that they were there at the time.

Q. Did you have occasion in those early days to travel down through this so-called Delta zone and go over the roads in it?

A. Yes, we had to market our crops over those roads, hauled them to market and did our traveling.

Q. Through this so-called Delta zone, you mean?

A. We hauled for several years all our grain to Norcross and Herman to the markets along the Great Northern railroad, and we had to go through that zone then.

Q. You say you hauled grain to Herman, Grant county?

A. Yes sir.

Q. What was the first town that was established after your father settled there—market town?

A. Herman was our nearest market town the first year or two—the first year, the first crop anyhow, we hauled to Herman.

Q. How soon afterwards was the market at Norcross established?

A. Well, I don't remember, but it was two or three years after I guess.

Q. And the market of Charlesville marked on the map here?

A. That was way later.

Q. Subsequent to 1896?

A. Yes, it must have been in 1904 or 1905, along there.

Q. When was Wheaton established?

A. I think in 1884.

Q. So that in passing from your farm to Herman you went, you say, directly across this so-called Delta zone area?

A. Yes sir.

Q. How were the roads in those days?

A. Well, in the early years there was no roads, no grades at all. We traveled right across country.

1104 Q. Could you travel right across country?

A. Well, of course, we avoided the lowest places and creeks as much as possible, but otherwise we went right across.

Q. With loads?

A. Yes sir.

Q. Wagon loads of grain?

A. Yes, and we hauled our lumber that way out for the buildings.

Q. Can you mention any section lines in particular on which there were good roads in those early days?

A. We used to cross the river at the junction of the Mustinka and Twelve Mile creek, then we would go over in Section 7, following north of the Mustinka, and as we got out about Section 8, then we would angle off a little towards the south and hit the railroad track out in near where the station of Gorton was at that time, and then we would follow the east side of the railroad track into Herman.

Q. About when was that?

A. It would be in '78 and '79. And then we had another road that we could also take. We would cross Twelve Mile creek somewheres about Section 30, and then cut diagonally across to Herman.

Q. About the northeast quarter of Section 30 in Redpath?

A. Yes sir.

Q. And then you cut diagonally across towards Herman?

A. Yes.

Q. Could you drive across there with a team?

A. Yes sir.

Q. That would be right across this so-called Delta zone?

A. Yes sir.

Q. Now this area that is colored here light blue, this so-called Delta zone has been described by the witness Ralph prior to

1105 the year 1896 as a swamp area, overgrown with rushes and aquatic grasses and practically a watery waste, and in a great part a lake surface unsuited for human habitation; containing not more than ten or twelve settlers in 1896, and they were perched up on the high places and the water spread out around them. Mr. Hawkinson, is there any truth in that statement?

A. No sir.

Q. How did those lands compare, from your earliest recollection and up to the year 1896, with respect to water—surface water being upon them or standing upon them, how did they compare with the other lands in Traverse county and the surrounding counties?

A. Well, pretty much the same as the most part of Traverse county, I guess, except that in flood seasons or a lot of rain, and in the spring when there was a lot of snow to melt they would be flooded, part of them.

Q. Would the water stay on there?

A. No.

Q. Would it stay on to such an extent as to make the lands unsuited for cultivation?

A. Why, no.

Q. Which way would the water run?
A. It would go north. In a northwesterly direction.
Q. How does it go now?
A. Same direction.
Q. The flow is in the same direction as it was then, and is it about in the same quantity?
A. I should think so.
Q. That is in flood times, in times of spring freshets?
A. Yes sir.
1106 Q. Is that what you refer to?
A. Yes sir.
Q. Now it has been testified here that these waters remained upon these lands and evaporated and seeped away, and there was no more than fifty per cent of what now reaches Lake Traverse that ever reached Lake Traverse in a state of nature—what about that?
A. Why there must have been a lot of water there but I didn't see it. I mean if that is the case it must have been a lot of water there.
Q. You never saw it?
A. No.
Q. Or heard of it before?
A. No.
Q. Did you see these lands, pass over them in the year 1916?
A. Yes.
Q. What was their condition through that year as to surface waters?
A. Pretty wet, pretty wet year.
Q. How did 1916 compare with other years?
A. I think it was probably one of the wettest years.
Q. In that area?
A. Yes sir.
Q. And the surrounding area?
A. Yes sir.
Q. Was there any time in your recollection, Mr. Hawkinson, that you ever saw any more surface water upon the lands in this so-called delta zone than you did in 1916?
A. I don't think so.
Q. Now what was the condition of the farm buildings and improvements as this so-called delta area became settled up
1107 as compared with farm improvements upon other lands in Traverse county and the surrounding territory?
A. Just about the same, I should judge.
Q. And has that always been true?
A. Yes sir.
Q. Now about the increase and growth in the value of these lands as compared with other lands in Traverse county and the surrounding territory?
A. Well, they have increased in proportion as the others have.
Q. Did you ever hear before this came *came* up of there being any such thing as a delta zone in this area that has been marked out here and described by the witness Ralph?

A. No, this is the first I have heard that term applied to that territory.

Q. Well, is there any area there distinguished from or markedly different from the other lands in Traverse county *of* any of the surrounding counties there?

A. We didn't use to consider it so.

Q. Well, was it ever any different?

A. Why, no. It was a little difference in the surface, that is, it was more level—a certain stretch of country there, but with the exception of that—it has that characteristic.

Q. Of being level?

A. Yes sir.

Q. Well, how about the townships around it?

A. Well, towards the west and along the lake that would be a little more undulating, and as you go east into Grant county a little more undulating.

Q. Well, the town of Clifton now—when you speak of this do you have particular reference to the portion of this delta zone in the town of Redpath?

1108 A. That included.

Q. How about the lands down in Clifton township south of there? How did that compare with the other lands in Traverse county?

A. About the same. They might be a little higher than the Township of Redpath.

Q. And how about the drainage of them—the natural drainage?

A. Probably the drainage advantages are a little better.

Q. The natural drainage advantages, you mean?

A. Yes, for the reason that it is higher.

Q. I assume that you are of course very familiar with the two streams known as Five and Twelve Mile creek-?

A. Yes sir.

Q. Now it has been testified here by the witness Ralph that this Twelve Mile Creek by overflowing its banks inundated a considerable area along its course in this so-called delta zone—what about that?

A. Twelve Mile creek you say?

Q. Yes.

A. Well, it has down below our place, certain years.

Q. It has overflowed southward of your place in Section 18 in certain years?

A. Yes sir.

Q. For how far a distance to the south?

A. Well, it wouldn't flood any distance to the south—below that would be north and northeast.

Q. It wouldn't flood any farther south than your place in 18?

A. No.

Q. And would it flood some to the north and northwest?

A. Yes sir.

Q. About at the place where the old Mustinka comes into it?

A. A little above that even.

1109 Q. Above Mr. Newman's place?

A. Yes, in section 7.

Q. Mr. Newman's place, as I understand it, would be right south of the confluence with the old Mustinka and Twelve Mile creek, in Section 7?

A. Yes.

Q. Now north and northwesterly of his buildings this Twelve Mile creek would overflow its banks?

A. Yes.

Q. Where would it go then?

A. It would flow down the river except when it was very high part of it would go across.

Q. Where?

A. Northwesterly into the Tintah slough.

Q. And did these overflow waters go in any other direction except northwest?

A. Not that I know.

Q. And would the water, after flowing over in this way, that remained in the Mustinka river remain in the channel in these times of flood?

A. After the flood conditions were down somewhat it would follow the channel down, of course.

Q. Let me ask you if within your knowledge these overflow waters would go to the south and southwest back into the channel of the Mustinka?

A. Well, it would go across portions of the country there.

Q. What portions?

A. Well, it seems, when it is real high it leaves the bank, oh say, about 80 or 100 rods north of our buildings and then goes across northwest into the river down there.

Q. You mean northwest?

1110 A. Southwest.

Q. And into the river where?

A. At the mouth of that cut-off.

Q. Where the present cut-off comes in?

A. Yes sir.

Q. Is that what you mean?

A. Yes.

Q. What is the nature of the channel of the Mustinka river—by which I mean the Mustinka after it is joined by the old Mustinka in Section 7 on around the bend to the north?

A. In What respect?

Q. As to whether it has a deep, well-defined channel?

A. Oh yes.

Q. It is well defined?

A. Yes, certainly it is.

Q. Very easily discerned?

A. Surely.

Q. Now continuing after the turn to the north, southwardly, slightly southeasterly and then southwesterly down to the place where the present cut-off comes in, what is the nature of that channel?

A. It is about the same.

Q. It has been testified here that a thousand feet above the place marked by the present cut-off the channel was practically indistinguishable there and couldn't be discerned?

A. Why, no. It has running water there right along, except when it is too dry and the river is down so there is none to run.

Q. Well-defined channel there?

A. Yes, sir. I have trapped along the river and hunted

1111 along the channel there.

Q. Now I want to ask you about the old Mustinka river taking the point where it comes into Twelve Mile Creek in Section 7 there by Mr. Newman's house and continuing eastwardly down to where it is joined by Five Mile Creek, and on southeasterly and easterly through these Redpath sloughs, and on over—we will say to the county line between Grant county and Traverse county—what is the nature of that channel, or what was the nature of that channel?

A. Well, it is not as deep as it is further down about Newman's, but it is a pretty well-defined river there, or channel.

Q. Always was?

A. Oh, yes. Pretty winding, but it can be followed plainly.

Q. Easily discerned and followed?

A. Yes, sir.

Q. How do you know that?

A. Well, I have cut hay along there and I have traveled along there hunting.

Q. Trapped?

A. I haven't trapped up along there, but I have hunted and cut hay. I have taken notice more particularly when I have made hay because I have cut hay off of it several years in succession.

Q. And I take it it was the overflow from that low portion of the river that created these Redpath sloughs?

A. Yes sir.

Q. Now it has been testified here that the Five Mile creek before the construction of this Mustinka state ditch overflowed its banks and inundated a large area of this delta zone. Mr. Hawkinson, what about that?

A. Well, I have seen it do that to-.

1112 Q. You have seen it overflow?

A. Yes sir.

Q. Where?

A. It comes through Sections 21 and 27. I have seen it flood over there down towards its junction with the Mustinka.

Q. Now from Section 27, you say, down stream, you have seen it flood down to its junction with the Mustinka?

A. Yes.

Q. How frequently, Mr. Hawkinson?

A. Well, I have seen it a few times.

Q. Was that a general condition or one in times of high water?

A. I have seen it in the summer when there has been a lot of rain.

Q. How wide would it get, about?

A. Oh, down there below Section 27 it would spread out almost to join with the flood waters of the Mustinka.

Q. Now that was in what section?

A. Section- 27, 22, 21 and 20.

Q. That would be right in these Redpath sloughs?

A. Yes sir.

Q. Now above that, going upstream, did you ever know of its overflowing?

A. No, I haven't over there, from there up.

Q. What is the nature of the banks—its channel—well, say, from the south line of Section 27, upstream?

A. They are a little higher.

Q. How was the land between Five Mile creek and Twelve Mile creek, we will say from about section 28, the east line across to Twelve Mile creek and continuing then on up to the confluence of the
1113 Five Mile creek and the Mustinka, and then over to the confluence of the Mustinka with Twelve Mile creek—how is that land?

A. Very good land.

Q. Was it wet land—overflooded land at all?

A. No, not except in very high water it is probably overflooded some.

Q. Would the water remain on there so as to impair the usefulness of the land for agricultural purposes?

A. No, it is all cultivated. Now 28 and 29 and that part of 20 between Five Mile creek and Twelve Mile creek, except in the draws, I don't think was flooded. There is some ravines there where it backed up.

Q. Well, going on north from where the present cut-off goes across between Five Mile and Twelve Mile creeks up into the confluence of the old Mustinka—how is that land in there?

A. Well, it is pretty much the same as above there, and I don't know as it is flooded there except farther down towards Section 7 and the north part of 8.

Q. Was your land, the north half of Section 18?

A. Yes sir.

Q. Was that flooded?

A. Just a very little of it?

Q. At what times?

A. High water.

Q. Would that impair its usefulness for agricultural purposes?

A. No, I used it always and got a pretty fair crop.

Q. How about schools in this so-called delta area, Mr. Hawkinson?

A. Well, we had our schools.

Q. You had schools there established from time to time?

A. Yes sir.

1114 Q. The same as other portions of the county?

A. Yes sir.

Q. You will recall the time of construction of this first section of the Mustinka ditch in from 1894 to 1896?

A. Yes sir.

Q. Do you know the effect of that first section of the ditch on the Redpath sloughs and the lands generally on either side of it?
A. Yes.
Q. What effect did it have?
A. Well, I don't know if it had much or not.
Q. You don't know of much of any?
A. It might have taken the water off there a little faster—the flood waters.
Q. How far to the north and to the south did it affect the land about?
A. Oh, possibly half a mile on each side. Not as much as that on the north side.
Q. Now do you recollect the time of the construction of the last part of the Mustinka ditch, the cut-off from Twelve Mile creek westerly to the old channel?
A. Yes sir.
Q. And then on down the river?
A. Yes sir.
Q. It has been testified here that that new section of the ditch had the effect to drain these lands along the Redpath sloughs and up in there in the year 1916 and make them dry, or comparatively so as to what they were prior. What about that?

Mr. Bronson: Objected to as not a proper statement of the evidence, leading and asking for a conclusion of the witness
1115 and not for actual facts as he observed them.

A. Why, I don't think it has, any more than the way they were drained before.
Q. Was there as much water in these Redpath sloughs in 1916 as there was before any part of this ditch was constructed do you think?
A. I think so.
Q. And did it remain there just as long?
A. Yes sir, I think so, especially in the spring floods.
Q. After the construction of this new part of the ditch what effect, if any, did it have on the flood waters that went northwesterly into the Tintah slough and on into the Rabbit river, Mr. Hawkinson?
A. I don't think it made much difference, if any.
Q. Why?
A. Well, I would not be prepared to tell. It seemed to me that there was just as much water going as it did before around the bends in the river, going acrossed the same as usual.
Q. Did you observe it there in the year 1915?
A. Yes sir.
Q. In the summer time?
A. Yes sir.
Q. Did the water go over then into the Rabbit river?
A. Well, I wasn't far enough to see—far enough over to tell that.
Q. How about 1916?
A. About the same way, I guess.
Q. Did you observe whether it did go over into the Rabbit river that spring of 1916?

A. I wasn't far enough over. I could see there was a sheet
1116 of water from where I could see right across.

Q. Right across where?

A. Down by Teskey's and Newman's and right across there.

Q. And in 17 did you observe any?

A. In the spring, I did. However, in the spring of 1916 farther up I noticed water going across.

Q. Farther up where?

A. Farther east—out in Section 12, of Redpath township. Quite a swift current. I crossed with a buggy and I had to get up in the seat to keep from getting my feet wet. There was quite a current.

Q. That was the spring of 1916?

A. Summer of 1916.

Q. Which way was the water going?

A. Northwesterly.

Q. Did this state ditch apparently have any effect upon the waters there?

Mr. Bronson: Objected to as calling for a conclusion of the witness, not actual facts, witness not pretending to be an expert.

A. No sir.

Q. Well, had you seen any previous years the water going northwesterly across Sections 12 and 11?

A. Yes sir.

Q. In the Town of Redpath?

A. Yes sir.

Q. Up in around the farm of a man by the name of John H. Hanson?

A. Yes sir.

Q. How frequently did you see the water going that way, Mr. Hawkinson?

A. Well, whenever I had occasion to go that way in time
1117 of *of* high water. I have also seen some water running in these draws across there.

Q. Where does that water go?

A. Into the Tintah slough. It follows ravines and draws and empties into the Tintah slough, and from there I can't tell where it goes, into the Rabbit river, I think.

Q. The Tintah slough drains into what?

A. Into the Rabbit river, I understand.

Q. Now since the construction of that first or second section of the ditch have you seen any less quantity of water going northwesterly there through these draws, as you spoke of them, in Sections 11 and 12 than you did before?

A. I don't think so.

Q. You are familiar with the place where the new cut-off ditch joins the old Mustinka river channel there in the Northeast corner of Section 23 in the town of Monson?

A. Yes sir.

Q. And is there a Swede church, as they call it, located there at that point?

A. Yes sir.
Q. Which direction from the cut-off ditch?
A. It is right on the south of the line that the ditch follows.
Q. How near does the ditch come to the church?
A. Within 75 or 100 feet.
Q. Have you observed that cut-off ditch since it was put in there in the year 1913, particularly in the early spring, Mr. Hawkinson?
A. Yes sir.
Q. What can you say as to its operation?
A. In the spring?
Q. Early in the spring at the time of the break-up?
1118 A. Well, generally if there is some snow it will be all filled with snow and it will open up several days after the waters begin to come down the river.
Q. How many days after?
A. Oh, I don't know. That depends upon the way it is packed. Four or five days probably—three days.
Q. And how about the old channel around the bend?
A. Well that will be going full.
Q. Take the year 1916, the spring of 1916, did you notice what time this cut-off ditch began to carry water as compared with the old channel?
A. It must have been a couple days after the water began to flow that that opened up so as to relieve any, before the water would go through so it would relieve.
Q. You mean two days by that?
A. Yes, anyhow two days.
Q. And I suppose it would gradually open up and carry the water?
A. Yes.
Q. Now in 1917, did you observe its operation in the early spring?
A. Yes.
Q. Tell us about that?
A. Well, it would be about the same way. It would open a good deal later—a lot of snow. It was drifted practically fully all the way from the Swedish church up to—well a mile.
Q. How about the old channel during that time?
A. Well, the water comes down like as usual in the river.
Q. Now from the Swedish church on down, we will say to the Milwaukee Railroad bridge there is an area that has been
1119 spoken of in there along the river that is at times overflooded. What do you know about that?
A. Well, I know it has been flooded there.
Q. How was it before the construction of this ditch?
A. Used to be flooded.
Q. And how has it been since the construction of the ditch?
A. Flooded in high water.
Q. What has been the difference if any between the amount of flooding there before this ditch was constructed and afterwards?
A. Well, I don't think there has been much difference.
Q. Take the year 1916—was that area flooded?
A. Yes, I think it was.

Q. And did you observe the waters there?
A. I did.
Q. And the length of time they remained there?
A. I didn't pay so much attention to how long they were there, but I know they were there.
Q. From your observation was there any less waters there or did they stay there any less time than they did before the ditch was made?
A. No, I think they were there just about as long.
Q. And in what quantity?
A. About the same.

Cross-examination.

By Mr. Bronson:

Q. This territory along from the Swedish Church down to the Milwaukee Railroad bridge that has been talked about was settled up rather early, was it not, as you recollect?
A. Oh, yes.
Q. Settled up as early as the territory around where you
1120 live in Section 18?
A. Shortly after.
Q. How much after, do you say?
A. Oh in the years following immediately after we settled.
Q. And this territory on down from this Swedish church to the Milwaukee Railroad bridge along the river there extending back a mile each side along the river from 1878 to 1894 was used for agriculture purposes?
A. Yes.
Q. Lands farmed and broken up?
A. Yes sir.
Q. Good crops raised there?
A. Yes sir.
Q. Farm buildings there?
A. Yes.
Q. And from 1878 to 1894 you raised crops there nearly every year?
A. Yes sir.
Q. As you observed it?
A. Yes sir.
Q. Good crops?
A. Pretty fair crops.
Q. Good as anywheres in Traverse county?
A. Compared about the same.
Q. You have the ability to recollect back to 1878?
A. Well, I wasn't down there so often, but we had out—we came down there occasionally. It is not far away and we knew the neighbors there and got together and talked over matters.
Q. And you saw the community develope from 1878 to 1894?
A. Yes sir.

1121 Q. Into what might be termed a well-settled, good farming community?

A. Yes sir.

Q. Now your land seems to lay west of Twelve Mile creek?

A. Right on the west bank.

Q. All of it?

A. Well, the river goes through the north quarter, Twelve Mile creek.

Q. How much have you on the east side?

A. About 55 acres.

Q. When I talk about your land I am referring to the family land, so there will be no misunderstanding. Now you stated in your testimony that the land east of there in this, what we have termed delta zone for the purpose of reference, is flat, generally speaking, level prairie?

A. Yes sir.

Q. And in the western part of the county lands are a little bit more rolling and a little more undulating?

A. Yes sir.

Q. And generally speaking, Traverse county is a flat level prairie?

A. Yes sir.

Q. You have observed in the springtime from 1878 up to the present time flood waters come in this delta zone?

A. Yes.

Q. And some of those come from the south and some from the east, do they not?

A. Yes sir.

Q. Some would come from Twelve Mile creek from the south, and some from Five Mile creek from the south and some from the Mustinka river to the east?

A. Yes sir.

1122 Q. And in this region you have enumerated two sloughs, one known as the Tintah slough, and another known as the Redpath slough or sloughs?

A. Yes.

Q. In the springtime you have noticed these Redpath sloughs to receive flood waters that come along, in the spring or in the summer time, and water would stand in these sloughs some time?

A. Yes, it would a while.

Q. That would depend upon the season and seasonal conditions—if there was more rainfall water would stand there longer than if there was no- so much rainfall. Is that correct?

A. If there is a larger quantity to go through of course it would take longer than it would if there was not so much.

Q. In other words when flood conditions existed these Redpath sloughs and the Tintah slough were there to receive the flood waters?

A. Yes.

Q. And they received them?

A. Yes.

Q. And sometimes during these years when conditions of the season were wet, either in the spring or summer, you have observed

not only these Redpath sloughs to have flood waters but lands to the north of have flood waters?

A. Yes.

Q. And you have observed, generally speaking, these flood waters going to the northwest?

A. Yes sir.

Q. Like you mentioned in Sections 11 and 12 where they went to the northwest?

A. Yes.

1123 Q. And one season you mentioned going acrossed there and seeing waters in Sections 11 and 12 over the land?

A. Yes.

Q. And you drove across in a buggy?

A. Yes sir.

Q. And you stood up in the buggy, so as not to get your feet wet—on the seats?

A. Yes sir.

Q. And you observed at other times along this bow of the Mustinka river, which is intercepted now by this cutoff ditch, flood waters in the spring overspreading lands on either side and flowing, generally speaking, in flood times northwesterly?

A. Yes, that is from our place it runs northwesterly.

Q. And you observed that also east of your place?

A. Yes sir.

Q. Sections 11 and 12 are east of your place?

A. Yes sir.

Q. So that the conditions, generally speaking, from sections 11 and 12 even over to sections 11 and 12 in Monson township in times of flood in the spring—there would be bodies of water there overspreading the land and flowing, generally speaking, perhaps gradually in a northwesterly direction?

A. Yes.

Q. Now you have mentioned about the lands in Clifton township being a little higher than lands in Redpath township. In other words, there is a gradual slope from Redpath township southward?

A. Yes sir.

Q. And by that you mean in your question on direct examination this gradual slope, do you not?

A. Yes sir.

1124 Q. Are you acquainted somewhat with the lands in Grant county?

A. Some.

Q. Do you know about there being some state lands over there in 1893 and 1892?

A. I couldn't say as to that. I didn't keep track of it.

Q. You have been over to Norcross some springs and seen water standing there around in that community?

A. Yes.

Q. To the east?

A. Yes.

Q. Seen flood conditions over in Grant county along the Mustinka?

A. As far up as the railroad track and a little beyond along the Mustinka.

Q. That is, you observed in flood condition times high water to exist up towards Norcross from your place east and then beyond there into Grant county?

A. Yes sir.

Q. Can you recollect back as a boy to the flood of 1881?

A. Yes sir, of course that is only at our place. I wan't off our land then.

Q. You haven't any recollection—you didn't see any flood conditions at Norcross that year?

A. No sir.

Q. But you saw flood conditions around your place?

A. Yes sir.

Q. And over this delta zone flood conditions existed?

A. I presume so.

Q. Well you saw it, did you not?

A. Well, around home.

Q. That is east?

A. North and east as far as we could see.

1125 Q. That is in the springtime of 1881? Was it not in the spring?

A. Yes sir.

Q. And towards the summer some too?

A. Well, it might have been into the summer. It may have been pretty wet. I think it was.

Q. You could see from your place water to the north toward the Tintah slough, and water east toward Norcross?

A. Yes sir.

Q. And some water south?

A. Yes, up along the river.

Q. Was this a very exceptional flood condition in 1881 as you now remember it?

A. I think so. It was a lot of water in our yard. We moved around with boats. That was the only way we could get to the outbuildings.

Q. Even on your land?

A. Yes.

Q. Your land has not been subject to much overflow while you lived there?

A. No, not much. It is only that year and 1897.

Q. That is as far as flood conditions are concerned with reference to your land 1897 and 1881 are high water marks?

A. Yes.

Q. In other years your land has not been flooded in that area?

A. No. In 1897 it wasn't high enough to go acrossed our yard either, I don't believe.

Q. Not as high as it was in 1881?

A. No.

Q. But it was over your land somewhat?

A. Yes, sir, a little bit.

Q. Were drainage conditions a little bit better, Mr. Hawkin-
1126 son, on the westerly side of Twelve Mile creek than they were on the easterly side as far as overflooded lands were concerned, or as far as getting rid of surface waters were concerned?

A. I don't know. We always thought they was a little higher and that was the reason why they weren't flooded.

Q. That is on the westerly side?

A. Yes sir.

Q. And that the easterly side was just a little bit lower?

A. Yes sir.

Q. And for that reason lands on the west side were not subject to surface waters quite as much as those on the easterly side of Twelve Mile creek?

A. No sir.

Q. Now as comparing Five with Twelve Mile creek, would you say Twelve Mile creek a better bed or channel or Five Mile Creek?

A. Twelve Mile creek had.

Q. And as comparing the Mustinka river in the bed north of the cut-off ditch—would you say the banks and channel and bed of the Mustinka river was better or poorer than those of Twelve Mile creek?

A. Well they are not as well defined. They are not as high. The channel don't seem to appear as deep. We always thought it was because the land was a little bit lower.

Q. Now referring to the portion of the Mustinka river that was intercepted by the cut-off ditch—you know what I mean?

A. I understand.

Q. And the banks and channel and bed of this Mustinka river between the portions where the cut-off ditch intercepts it—I will ask you to state whether or not some parts of the bed, bank and channel of the Mustinka river in that portion are not less defined than they are in other portions?

1127 A. I think portions are.

Q. That is to say, for instance, where the old Mustinka river crosses a portion of Sections 16 and 17 in Redpath township, are the banks and bed and the channel of that river in those sections less well-defined and less marked than they are where the river passes through Section 14 in Monson township?

A. Oh, yes.

Q. Now Mr. Hawkinson, as the old river at this cut-off interception progresses through Sections 16 and 17 of Redpath township is the bed and the banks of this river somewhat spread out and low?

A. Yes, they are.

Q. And it is by reason, is it not, of the river in this immediate portion of *Redpthat* township that I have just referred to, where the banks of the river are low and where the channel is less well-defined, that the Redpath sloughs are formed, and by reason of which in times of high water the waters of the old Mustinka spread out somewhat over these sloughs?

A. Oh, it must be that.

Q. Now at the present time between Sections 16 and 17, where this old Mustinka river goes in Redpath township, as you drive north and

south between those two sections is there any water in that old Mustinka river?

A. Not just now, I don't think.

Q. There is water in the old Mustinka river down in Monson Township, is there not?

A. In some places.

Q. Where the river goes through Sections 12 and 14?

A. I think so.

Mr. Palmer: Do you mean it is flowing or just standing?

A. It was standing in some places. I don't think it is any running there.

1128 Q. Now you have lived there all these years, as I understand it, practically speaking, on this farm that you have described?

A. With the exception of probably three—four or five years.

Q. What four or five years?

A. I was gone in 1892 and 1893—1902, 1903, 1904 and 1905. I was there part of the summer in 1905.

Q. You have therefore seen this territory in the delta zone traversed by these ditches we have talked about in the evidence here—county, judicial and state?

A. Yes sir.

Q. And you have seen these tiling operations performed in that district?

A. Some of it.

Q. Now I will ask you to state whether you were there when this first section of the ditch was put in?

A. Yes sir.

Q. This state cut-off ditch which we have been terming the Mustinka state ditch runs on the south of your land, does it not?

A. Yes sir.

Q. Now you have seen in this territory generally described as the delta zone ditches put in there, county or state or judicial, on practically every section line to the north and south of you?

Mr. Palmer: Objected to as there are no state ditches whatever there except the Mustinka state ditch.

A. Yes sir.

Mr. Palmer: Is that what you mean?

A. I have seen the ditches put in there.

Q. Now these ditches all have as their place of outlet the Mustinka river?

1129 A. Yes sir.

Q. In your opinion were these ditches necessary and proper and did they benefit the land?

A. They would, I guess, to a certain extent.

Q. And in your opinion did this land need the drainage for the purpose of which these ditches were put in?

A. Some years they would and other years they wouldn't.

Q. In dry years you don't need any such ditches?
A. No sir.
Q. In wet years you do need such ditches?
A. Yes sir.
Q. And that is true of all lands, is it not?
A. I suppose so.
Q. In 1917, this has been a dry year, has it not?
A. Yes sir.
Q. 1915 and 1916 were wet years?
A. Yes sir.
Q. Did you get a crop on your land in 1915?
A. Yes sir, some.
Q. Harvest it?
A. Yes sir.
Q. Thresh it?
A. Yes sir.
Q. Get a crop on your land in 1916?
A. Very little.
Q. Your land wasn't flooded in 1916?
A. Yes sir, some of it—that is not from the river.
Q. Not by the river?
A. No, not by the river.
Q. Did you have water standing on your land in 1916?
A. From precipitation, from rain, yes.
Q. And flooding the land?
1130 A. Yes, more or less.
Q. How deep?
A. Oh, some pot-holes six inches and some a foot at times.
Q. You say in the pot-holes?
A. Yes sir.
Q. But there wasn't any flooding except on the east side of Twelve Mile creek from the river?
A. No, there wasn't any from the river.
Q. That is, your land was wet from rainfall?
A. Yes.
Q. Not from floods?
A. No.
Q. Did you have a crop there in 1914?
A. Yes.
Q. A good crop or a poor crop or an average crop?
A. Oh, it compared with the general crop that year, I think.
Q. And was that good or poor or average?
A. About an average crop.
Q. You plowed there did you that fall of 1914?
A. Yes sir.
Q. Plowed your land?
A. Yes sir.
Q. Did you see the other lands in the delta zone east of you plowed that fall?
A. I think so.
Q. That is in Section- 7 and 8, for instance, north of you, north and northeast of Section 20, and to the southeast of you?

A. I think so.
Q. 1915, did they have a crop on Section 20 in Redpath township?
A. Why, I think they had some crop. Now I can't say.
1131 Q. You say they plowed the land there that year?
A. 1915?
Q. Yes.
A. I think they did.
Q. You saw crops put in on this delta zone in 1915?
A. Oh yes, in some parts of it.
Q. And you saw crops harvested and threshed in 1915?
A. Yes sir.
Q. And did you see crops put in, in 1916?
A. Yes sir.
Q. Plowing done in 1916?
A. Yes sir.
Q. And crops harvested and threshed in 1916 on this delta zone?
A. Yes sir.
Q. In the spring of 1916 there was considerable water as you have stated?
A. Yes sir.
Q. Flood conditions existed?
A. Yes sir.
Q. And you saw the water going over this delta zone northwesterly in some portions toward the Tintah slough?
A. Yes sir.
Q. You weren't up to the Tintah slough itself?
A. No sir, I wasn't.
Q. You don't know what waters went over in the Tintah slough?
A. No, I couldn't say.
Q. You don't know anything about whether there were some waters in the spring of 1916 flowing through that washed out a culvert of this ditch where there is some dirt thrown up on the north side of it, on the south line of section 6?
A. That was washed out.
1132 Q. You know about the culvert being washed out?
A. Yes sir.
Q. You don't know anything about the water going through?
A. Well, it must have been water that washed it out. I could see water where I was standing there.
Q. From your place?
A. Yes, and I could hear the roar of the water as it passed through there during flood times.
Q. There was a ditch up there?
A. Yes sir.
Q. A culvert in there?
A. Yes sir.
Q. And a kind of embankment or dirt thrown up along the ditch?
A. It was to be used for a road.
Q. The embankment was thrown up so it makes a kind of high road along there?

A. Yes sir.
Q. And there was a culvert through that?
A. Yes.
Q. Now apparently, Mr. Hawkinson, in times of flood or wet seasons this Mustinka river in a state of nature did not have a channel sufficient or adequate to carry off rapidly and quickly the surface waters or flood waters?
A. No, not in high water.
Q. Now after this first section of the ditch was put in from Grand county in part, and running westerly into Redpath township, did you see sometimes in the spring, for instance 1897, flood waters coming from Norcross?
A. Yes.
Q. Did you see waters coming down that ditch?
A. Yes sir.

Q. And did you see flood conditions in 1897 and subse-
1133 quent years likewise in this Delta zone to the north and northwest of you?

A. Yes sir.
Q. And did you se- also in the years subsequent to 1896 flood waters down in this territory which counsel has asked you about between the Swede church and the Milwaukee railroad bridge?
A. Yes sir.
Q. And have you seen those farms between 1897 and 1909 flooded in the spring time with flood waters that came down there?
A. Must have been in 1907 and 1908.
Q. 1907 was a wet year?
A. Yes sir.
Q. And 1897 was a wet year?
A. Yes, '97 was wet in the spring.
Q. Did you see some of that land during the years from 1897 to 1909 unable to be put into grain corps on account of the flood conditions?
A. I think most of it was put in sometime in the year—probably late.
Q. You haven't seen floods exist there such a length of time between 1897 and 1908 so that some lands couldn't be put into crop?
A. I think some wasn't put in.
Q. And have you any recollection of waters coming down there some summers and destroying some crops and injuring some crops between those years?
A. I heard them talk about it. You see I haven't been through there when the flood was there.
Q. You haven't made any personal observations?
A. No sir.
Q. But you have seen the waters come down there?

A. I have seen waters standing spread out over the land
1134 from the banks of the river.

Q. This first section of the ditch went through the Redpath sloughs?
A. Yes sir.

Q. And was bigger than the old Mustinka river—the ditch was?
A. Oh, yes.
Q. And would carry more water than the old Mustinka river?
A. Well, it was deeper. Of course it wasn't as wide as the Mustinka river.
Q. I will ask you whether or not it would carry more water as you observed it within its banks than the Mustinka?
A. Well, that is a question because the Mustinka river while it was shallow it was wide and this would be deeper and have a deeper channel, but narrower. I would not be able to say.
Q. You don't pretend to give any testimony on that—you don't know?
A. No.
Q. After the first section of the ditch was completed did you notice whether or not at the end of it some flood waters came occasionally when there were wet seasons, more than they did before or not?
A. I don't think they were any worse afterward.
Q. You don't think that this ditch carried any more water than the old river did?
A. I don't think so, no.
Q. Counsel asked you about the general drain, or the way the waters went off in this Delta zone during wet years or in the springtime, and you said to the north and northwest, generally speaking?
A. Yes.
Q. Now after these ditches were put in, these county ditches, that we have been talking about, the water that those ditches car-
1135 ried didn't go to the north or northwest, but went in the ditches, did it not?
A. Well, it would fill those ditches up and then it would run acrossed there where it had a chance.
Q. But as much water as the ditches themselves did carry didn't go to the north and northwest?
A. No, I suppose it led that along in the direction of the slope of the ditch.
Q. And the way the ditches ran?
A. Yes.
Q. And before the ditches were constructed such water as the ditches did carry must have gone north and northwest as you have heretofore described?
A. Yes sir.
Q. Now the second section of the ditch—the cut-off portion—to start with runs south of your farm—you saw that ditch put in?
A. I did.
Q. And that carried water south of your farm westerly into the Mustinka river that formerly didn't go that way?
A. Some, yes.
Q. And the old Mustinka river channel is still there and that carries water in the springtime?
A. Yes sir.
Q. So that now, instead of having what you did in a state of nature—the old Mustinka alone, you have now in the spring-time, the

old Mustinka river running north of the cut-off ditch and the cut-off ditch that is running east and west, have you not?

A. Yes sir.

Q. And the cut-off ditch is as big as the old Mustinka river,
1136 is it not—its bed and channel?

A. As the old Mustinka river?

Q. Around the bow?

A. Oh, no.

Q. And this cut-off ditch where it enters the rectified Mustinka river to the west wouldn't carry as much water as the old Mustinka in a state of nature?

A. No.

Q. It will carry a little less you think?

A. I should think so.

Mr. Palmer: That is the cut-off less than the river?

A. Why sure.

By Mr. Bronson:

Q. But the Mustinka river and the cut-off ditch, both of them together, would carry more water than the old Mustinka river alone would? Would you say that is correct?

A. Yes, it would if unobstructed.

Q. That is when the Mustinka river is free of snow and ice and when the cut-off ditch is free of snow and ice the two of them together would carry more than the old Mustinka river did?

A. If the outlet were ample, I think they would. That is where the cut-off comes together with the bend of the old Mustinka river I think that the water from one direction obstructs the flow of the water from the other direction so I don't think it carries it out any faster for that reason.

Q. That is, in your opinion, the waters that come down the cut-off ditch in its present size and the water that comes down the Mustinka river, which is substantially as it was in a state of nature, as they come down into the place in Section 33 where the Mustinka river was deepened and cut out down toward Lake Traverse,
1137 do not carry, in your opinion, any more water than formerly?

A. No, I don't think so.

Q. Do not have the capacity to do it—is that the idea?

A. Yes.

Q. The Mustinka river as you have observed it from this place in Section 24 down to Lake Traverse than it did before?

A. Yes sir.

Q. It has the capacity to carry more water than it did before?

A. It would seem so, that it should.

Q. There is no question in your mind that a ditch that is six feet deep will carry more water than a ditch of three feet depth and of the same width?

A. Why, no.

Q. So after this Mustinka river has been deepened and rectified

and the channel straightened, and some cut-offs made, it would carry more water than formerly within its banks? Isn't that clear to you?

A. In ordinary times.

Q. Ordinary or not ordinary. What difference does it make whether it is ordinary or not ordinary as far as the amount it will carry within its banks is concerned?

A. It should that.

Q. You spoke about snow and ice filling up the cut-off ditch. It fills up likewise the Mustinka river, does it not?

A. To a certain extent.

Q. That snow will blow into the channel of the Mustinka river the same as it will blow and fill up the new channel of the cut-off ditch?

A. Yes, it will lodge in there.

Q. Now you say the Mustinka river has a little channel around that bow—the depression is a little larger than what the cut-off ditch is?

1138 A. It is quite a bit larger.

Q. Consequently there will be more snow blow in there?

A. There is room for more snow.

Q. And your observation of the way snow operates on a prairie with the winter winds is that depressions will fill full, will they not?

A. Some will.

Q. If there is wind and snow with which to fill them?

A. Yes.

Redirect examination.

By Mr. Palmer

Q. Which thaws out first, the cut-off channel or the river bed?

A. Well, the river bed has always been open first.

Q. Why?

A. Because there never was snow enough drifted in there to fill it completely.

Q. And which way does it run?

A. Well, it runs different ways. The cut-off runs east and west and the river winds of course.

Q. Now the fact that the cut-off is deep and runs east and west, does that have any effect on the time of its thawing out?

A. Well, it surely has. The banks are high and they obstruct the rays of the sun from reaching the snow to melt it as fast as it will in the river, where the sun can get at it more readily.

Q. And is it a matter of common knowledge among farmers that a north and south ditch is more effective, particularly early in the spring than an east and west open ditch?

A. Yes, it is recognized so.

Q. You spoke of the crop of 1916 in this so-called delta area. How much of a crop did you have that year?

1139 A. I had about 200 bushels of wheat.
Q. On how many acres?
A. Fifty-five.
Q. What was the quality of the wheat you did raise?
A. Very poor.
Q. How much would be an average yield?
A. Oh, that should have brought seventeen or eighteen bushels anyhow to the acre, an ordinary year.
Q. How did your crop compare with the other crops?
A. About the same.
Q. Take the whole of Traverse county and the adjoining counties, all those level lands in there, how were the crops in 1916?
A. There wasn't much crop. There was a corner harvested here and one there, and with the exception of that there was very little cut and harvested.
Q. What was the quality of what was harvested?
A. Very poor.
Q. Practically a crop failure?
A. Yes sir.
Q. What was wrong?
A. It was too wet.
Q. Too much rain?
A. Yes sir.
Q. And did that condition obtain generally through Traverse county and all the surrounding counties there in 1916?
A. Yes it did, except where land was better drained it was somewhat better crops of course.
Q. In 1915 what percentage of a crop did you have? An average crop?
A. Well, I should *I* think half a crop.
Q. What was wrong?
A. Pretty wet.
1140 Q. Was it a wet condition that caused *to* to have only about a half crop?
A. We ascribed it to that.
Q. Well, do you know whether that was the cause of it?
A. Well, it was too wet, we couldn't till the soil right or take care of it right.

(Adjournment taken until 2 p. m.)

September 29, 1917, at 2.00 p. m.

JULIUS H. TESKE, sworn in behalf of defendant, testified as follows:

Examined by Mr. Palmer:

Q. How old are you?
A. 47.
Q. Where do you live?

A. Traverse county, Minnesota, on the southeast quarter of Section 1, Township 128, Range 46.

Q. How long have you lived in Traverse county?

A. Well, when I come there first was in 1892 in the spring.

Q. Where did you live then for a time?

A. I was around Wheaton.

Q. Which direction from Wheaton?

A. East of Wheaton.

Q. On a farm?

A. I had a farm east about a mile and a half but I didn't live on it at the time. I was boarding in Wheaton, close by Wheaton at the time.

Q. When did you move upon this southeast quarter of Section 1, in Township 128, Range 46, which I believe would be the town of Monson?

1141 A. 1909, in the fall.

Q. Did you own this southeast quarter of 1 prior to the fall of 1909?

A. Yes sir.

Q. How many years?

A. Well, I just bought it that year, in July sometime.

Q. Who owned it prior to that time, Mr. Teske?

A. There was some heirs that owned it, Almstrong.

Q. The Almstrong heirs?

A. Yes, sir.

Q. Had you known the place some years prior to the time you bought it?

A. I didn't know much about it; of course, I drove through there years before.

Q. Do you know whether it had been farmed and improved for a good many years before you bought it?

A. Yes, sir.

Q. Had it been?

A. Yes.

Q. The buildings, how long had they been there, about, do you know?

A. Oh, about 10 or 12 years.

Q. What was the nature of the buildings and their condition?

A. In good condition.

Q. And were they good buildings, good farm buildings?

A. Yes.

Q. How were the fences and other improvements?

A. Well, there wasn't much of a fence there only a little pasture fence.

Q. What was the condition of the cultivation of the land when you looked at it to buy it?

A. It was all under cultivation.

1142 Q. Just in a general way, was it what you considered a good farm?

A. Yes.

Q. And did you buy it for a home for yourself and your family?

A. Yes, I did.
Q. And you have so used it ever since?
A. Yes.
Q. I might ask you here, what did you pay for it, Mr. Teske?
A. Of course, I bought that, there was another quarter belongs to it that was across the road in Redpath and there was only 144 acres and a trifle over and I paid 35—I think the whole amount was, I guess it come up to $35.65 an acre, something like that.

Mr. Bronson:

Q. How many acres?

Mr. Palmer:

Q. How many acres all-told?
A. It was 316 acres and I believe 1 acre, it is a little over 316.
Q. That included some lands in Redpath?
A. Yes.
Q. What section in Redpath township?
A. Six.
Q. This land across the—you say was across the road over in Redpath, Section 6?
A. Yes.
Q. Did that have buildings on it?
A. No, sir.
Q. And you mean that would — you paid for the whole tract, both the part that had the buildings on it in Section 1 and the part that had no buildings on in Section 6, you paid averaged up $35.65 an acre?
A. Yes, sir.
Q. And was that about the average for farm values in that
1143 county at that time, Mr. Teske?
A. Well, I couldn't buy any at that time, that is, for that price, around there any more.
Q. You considered that you got, in other words, a bargain on that farm?
A. That is what I considered.
Q. Was there any reduction in price on account of the land being flooded with water or anything of that kind? Is that why you got it at a bargain?
A. No.
Q. It was testified, I think, by Mr. Ralph here that that farm was particularly wet and swampy and subject to overflow, Mr. Teske; is that true?
A. It didn't overflow before any more than the other lands around there.
Q. And never did to your knowledge?
A. Not that I know of before.
Q. Now, after you moved there in the fall of 1909, I will ask you what was your observation in the time following as to water going

over from this northerly bend of the Mustinka river into the Rabbit river there by your place, whether it did or not?

A. I don't understand.

Q. Whether the water went over there by your place from the Mustinka river into the Rabbit river?

A. At the time I moved there?

Q. Time you have been living there?

A. Yes, sir.

Q. Is this the place that has been mentioned here as the point where the water overflowed from the Mustinka river into the Rabbit river east of the Teske house, does that have reference to
1144 your place there?

A. Yes.

Q. When is the first year that you observed the water flowing over there into the Rabbit river from the Mustinka, Mr. Teske?

A. The first spring I lived there it flowed over.

Q. That would be the spring of 1910?

A. Yes.

Q. And where did the water go over then?

A. East of the buildings and all around the buildings.

Q. This point east of the buildings, how near is that to the east line of that southeast quarter of Section 1?

A. It was all water.

Q. East of the buildings?

A. Yes, sir.

Q. In the spring of 1910?

A. Yes.

Q. And what was the course of the water, which way did it go?

A. It went north.

Q. Did it go nearly straight north along the east line or follow the east line?

A. It went north a little ways and then it cuts off, goes northwest.

Q. And into what? What does it go into there?

A. Oh, ravine or slough what you call it.

Q. There on your land?

A. It runs, I call it a lake on mine, from the lake it runs up into a kind of a ravine.

Q. Into what?

A. Into the Tintah slough.

Q. And from there on into what?

1145 A. Rabbit river, I suppose.

Q. Was that Tintah slough ditched out to the north into the Rabbit river when you came there?

A. I don't remember whether it was or not.

Q. There has been some testimony here that that Tintah slough ditch was constructed about the year 1910, I believe, Mr. Teske, that would be the next year after you went there; what do you remember about that, anything? Do you recall as to that?

A. I don't remember; it was ditched in there, that is all I know.

Q. Shortly after you came there?

Mr. Bronson: That is objected to as leading and already answered.

A. Yes.

Mr. Palmer:

Q. The next spring, spring of 1911, Mr. Teske, what about the water going over there?
A. I don't remember of any water going over last spring.
Q. 1912?
A. I don't remember, either.
Q. 1913?
A. I don't remember whether it did or not.
Q. 1915?
A. Yes.
Q. It did go over in the spring of 1915, you remember that?
A. Yes, sir.
Q. Early in the spring or in the summer?
A. It went both early in the spring and in the summer too.
Q. Take the spring of 1915, did you notice anything about the quantity going over, how much went over?
A. Well, quite a good deal went over.
Q. And for what length of time?
1146 A. Somewheres around a week or ten days, I don't remember exactly.
Q. Was there anything along the south line of Section 6 and the south line of section 1 at that time to obstruct the flow of the water to the north in the early spring of 1915?
A. No, there was not, not that I know of.
Q. And in the summer of 1915, what amount of water went over, would you say?
A. Well, it kept going off and on.
Q. Through the summer?
A. Yes.
Q. In considerable quantities?
A. Yes.
Q. For a considerable length of time?
A. Yes.
Q. How long would you say in the summer of 1915?
A. Well, maybe for three or four days at a time.
Q. And at different times during the summer?
A. Yes.
Q. How did it compare with the usual year, according to your best recollection of it?
A. Well, we had too much of it, that was all. I don't know what you might call it.
Q. There was a county ditch constructed beginning at its outlet into the Mustinka close by the southeast corner of Section 1 and extending easterly along the south line of Sections 6, 5, 4 and 3 of Redpath township, Mr. Teske, county ditch #10; is there a ditch there?

A. Yes, there is a ditch there.
Q. When was that ditch begun, when was the construction of that ditch begun?
A. 1915.
1147 Q. What part of 1915?
A. Well, they started in there in the spring to haul the material out but they didn't start to dig until way in the summer, until July or August, I don't remember which.
Q. And at which end did they start?
A. At the Mustinka river.
Q. They started at the Mustinka river?
A. Yes, sir.
Q. And dug up-stream, that is, dug east?
A. Dug east.
Q. So that the first part that they dug was on the south line of your land?
A. Yes.
Q. And across the east line of section 1. How far did they get that fall, do you remember about how far?
A. They finished it, the end.
Q. They finished the ditch that year?
A. Yes.
Q. Mr. Teske, near the southeast corner of section 1, which would be the southeast corner of your home farm, did you put any culvert or bridge in there?
A. I put a culvert in there.
Q. Across the east and west road?
A. Yes.
Q. Was there both a north and south road on the east line of Section 1 and an east and west road on the south line of Section 1—do the roads cross there on your southeast corner?
A. Yes.
Q. What kind of a culvert did you put in there?
A. Galvanized or steel, what you might call it.
1148 Q. Galvanized steel culvert, what size?
A. 2 foot, about 24 foot long.
Q. Was this culvert in one piece?
A. No.
Q. How many?
A. Two pieces.
Q. Each 12 foot long?
A. Yes, supposed to be.
Q. When this county ditch was dug, county ditch #10—how big a ditch was this at your south line, do you remember about how wide?
A. About 14 feet wide at the top.
Q. How deep?
A. About 8 feet, I should judge.
Q. Open?
A. Yes, sir.
Q. What was done with the dirt?

A. Throwed into the road.
Q. And what was done then?
A. Oh, they leveled it off.
Q. For what purpose?
A. For a road.
Q. Made a road of it?
A. Yes, sir.
Q. So the excavation from this ditch then, as I understand it, made a grade for a road?
A. Yes.
Q. How high a grade, Mr. Teske, from the surrounding land, how much of a grade?
A. Between two and three feet high.
Q. And was there a road before that?
1149 A. Yes, sir.
Q. A good road?
A. Yes, fairly good road to travel on.
Q. And this throwing up of this excavation and then leveling it off, did that make a better road from the road there?
A. Yes.
Q. It was through this grade that you put this culvert north and south at your southeast corner?
A. Yes.
Q. Tell us about the spring of 1916.
A. It washed that grade away there on the corner and half of the culvert.
Q. What washed the grade away there on that corner?
A. The water did.
Q. Coming from where?
A. Coming from the south going north.
Q. In the river, following the river, the water?
A. Went northwest across the grade to the Rabbit river.
Q. I mean was this water the overflow from the Mustinka river that washed out this grade that you speak of and the culvert?
A. It was from the overflow, yes.
Q. And which way was it going?
A. Going north.
Q. Which way did it wash this culvert?
A. North.
Q. How far did it carry the culvert?
A. About 30 or 40 rods.
Q. Up into the field?
A. Yes, sir.
Q. The whole culvert or only half of it?
A. Half of it.
1150 Q. How long was that half of that galvanized iron culvert?
A. Supposed to be 12 feet.
Q. And something about the weight of it, Mr. Teske?
A. Well, I never weighed it. I don't know how heavy they are but it took two of us to handle them around to put them in.

Q. And you say the water took out one-half and carried it come 30 or 40 rods into the field?
A. Yes, sir.
Q. How wide a place in the grade did the water wash out?
A. About 6 rods, more or less.
Q. That would be about 100 feet?
A. About.
Q. And can you say anything about the swiftness of the current to the north?
A. It was pretty swift.
Q. How deep was the water?
A. Between two and three feet deep and some places deeper where it washed out.
Q. It was a strong, swift current, some two or three feet deep?
A. Yes, sir.
Q. And about how wide? How wide did it spread out after it left this 100 foot space that it washed out through the grade?
A. Well, it spread out quite a little.
Q. Can you give us any better idea about that?
A. Well, about 60 rods, down there it was about 20 rods wide.
Q. 60 rods down to the north?
A. Yes, sir, but how deep it was I don't know.
Q. Which direction did that water take, how far did it go north?
A. Well, it run north into my lake there and then it followed the ravine do*nw* out of the lake further north.

1151 Q. This lake as you speak of it, I wish you would kindly look at the map here, Defendant's Exhibit 4 and tell me whether that is correctly represented by this indication of a ravine here, some 40 or 50 rods north of your buildings?
A. It is a little further than 40 rods from the buildings.
Q. About how far is this lake, as you speak of it, from your buildings?
A. 40 or 50 rods.
Q. What direction from your buildings?
A. North.
Q. In the spring of 1916, about how many days do you think the water continued to go north in this course that you speak of, about how long a time?
A. It w*w*ent all the way from a week to ten days.
Q. Was there any place where the overflow water from the river went north into the Rabbit River except this place at your southeast corner?
A. At the west side of my quarter.
Q. On the west side of your quarter?
A. On the southwest quarter of 1, it went across there.
Q. Do you mean there were two places, one the west line of your quarter and then another over in the southwest quarter of 1, is that what you mean?
A. Yes, sir; it went across on the southwest quarter and it went across on mine.

Q. Went across on yours, on the west part of your quarter too?
A. No, sir, not on the west side, only on the—east of my buildings there.
Q. The southwest quarter of 1, who owns that?
1152 A. Krenz.
Q. Has he some buildings there?
A. A barn and a granary.
Q. No dwelling house?
A. No, sir.
Q. What part of the southwest quarter of 1 are these buildings?
A. On the west side.
Q. Southwest corner or near it?
A. Along the river there.
Q. North of the river?
A. Yes, sir.
Q. Now, you say there was a place there where the water went over?
A. Yes, west of the buildings, along the road.

Mr. Bronson: What year?
Mr. Palmer: 1916.

Q. West of the buildings, along the road, you say?
A. Yes, sir.
Q. How much of a stream was there there, if you observed it?
A. It was about 3 feet wide and a foot deep, a foot and a half, something like that.
Q. You mean 3 feet wide or 3 rods?
A. There is a kind of a grade there.
Q. A road ditch, you mean?
A. Yes, sir.
Q. How was it in the summer of 1916, Mr. Teske, as to water going north there at either of those places?
A. There was some going north east of the buildings.
Q. How did that compare with the amount that went there in the spring of 1916, Mr. Teske, the amount that went
1153 there in the summer? Was it more or less?
A. Well, I don't know whether it was more or less, I don't remember.
Q. Was there considerable that went north there in the summer, quite a little stream?
A. Quite a little stream.
Q. Was there anything put in there at this point in the road where the grade was washed out for 100 feet, as you say, after the spring of 1916?
A. Not until late in the fall.
Q. In the fall of 1916 what was put in there then?
A. A bridge and the grade filled in.
Q. How large a bridge was put in there?
A. 8 foot wide.
Q. And how high? How much of a space underneath to the bottom of the channel?

A. About 5 feet.
Q. And then the grade was filled in again, was it, up to the ends of the bridge?
A. Yes.
Q. Now tell us about the spring of 1917, Mr. Teske, this last spring.
A. well, it washed the dirt away there from the bridge and went north.
Q. What time in the spring, about when?
A. Last part of March.
Q. You say it washed this grade out at the ends of the bridge?
A. On both sides of it.
Q. How far on both sides, do you think, Mr. Teske?
A. About 6 foot on one and 3 on the other, that is part way.
Q. And in addition, I suppose that all the water that could
1154 went under the bridge?
A. Yes, sir.
Q. Did it take the bridge out too?
A. No.
Q. Did you do anything to prevent washing out of more of the grade there?
A. Well, yes.
Q. What did you do?
A. I hauled on some manure to hold the water back to save the grade, otherwise the whole grade would have washed away again.
Q. Similar to what it did in 1916?
A. Yes, sir.
Q. Was there much of a current there this last spring, 1917, going north?
A. Yes, sir.
Q. And how about the quantity of water as compared with what you saw going there in 1916?
A. It was pretty near as much.
Q. And pretty near as strong a current?
A. Yes, sir.
Q. And for how many days did that continue, Mr. Teske?
A. It was over a week.
Q. In the spring of 1917?
A. Yes, sir.
Q. It has been testified here by George A. Ralph that if anybody saw any quantity of water going over north into Rabbit river at that point in the spring of 1917 they had a vision, they saw something that never existed. Are you positive and sure that you saw the water going over there in the spring of 1917, as you have described it?
1155 A. Yes, sir.
Q. And for over a week?
A. Yes, sir.
Q. And that it was in nearly as great quantity as 1916?
A. Yes, sir.
Q. And it washed out the grade on each side of the bridge?

A. Yes, sir.

Q. And would have taken out more of it if you had not piled in manure there to save it?

A. Yes, sir.

Q. Was that overflow water from the Mustinka river?

A. Yes, sir.

Q. Did the water go over by Krenz's place or buildings again in 1917 same as it did in 1916?

A. Well, a little.

Q. Mr. Teske, it has been testified here by the witness, Ralph, that there was a channel, well defined channel, running from your southeast corner northeasterly up into about the center of the west half of Section 6 and then turning north and then northwesterly and coming in to the road along the east line of Section 1 at a point near the northeast corner of Section 1 and from there on into the Tintah slough and Rabbit river, is that true?

A. Well, there is a little draw there on that corner, that is all I can say.

Q. Which way does the water run in that draw?

A. When the river gets up high it goes northeast and when the river drops she comes back again.

Q. Does it go on around up to the north into the Rabbit river that way?

A. I don't know, I have never been out that way when the
1156 water was high to see which way it run.

Q. Was there any channel along that course I have spoken of?

A. Not that I know of.

Q. You never knew of any there?

A. No, sir.

Q. And so far as your observation goes does the water that goes north into the Tintah slough and on into the Rabbit river run up *up* the road along your east line for about 80 rods as indicated here on the map and then turn northwesterly into this little lake you speak of on your land?

A. Yes, sir.

Q. And is that the only way you know of it going from your southeast corner?

A. Well, there is some going down the road straight north.

Q. Some goes on down the road straight north?

A. Yes, sir.

Q. What is the year that you have seen the greatest amount of water going over into the Rabbit river there since you have been there, Mr. Teske?

A. 1916 and 1917.

Q. 1916 and 1917?

A. Yes, sir, that is in the spring.

Q. Yes, in the spring of 1917, you didn't see any there in the summer of 1917?

A. No.

Q. What about your crops on your land there in 1916?

A. I didn't have much of any crop.
Q. Why?
A. It was too wet.
Q. What made it wet?
A. Some of it was overflowed and too much rain.
1157 Q. How did the rain in that year, as you recollect it, compare with other years that you have been in Traverse county?
A. Well, there was so much water fell that nothing could grow.
Q. Did you ever have it as bad as that before?
A. No, sir, not that I know of.
Q. Does the water overflow from the Mustinka river and run to the southwest back over into the channel further down southwest of your place in Sectons 11 and 12? Do you know anything about that, or have you noticed any of that?
A. I don't understand.

(Question is read.)

Q. Does the water from the Mustinka river near your place, does it run over southwest there same as it does to the north, overflow the south banks the same as it does the north banks, have you noticed anything about that?
A. It does some.
Q. I believe there was something said about a bridge over in the southwest part of Section 1, there by Krenz's buildings in the spring of 1916, was there a bridge there?
A. Yes, sir, an old wooden bridge there.
Q. How large a bridge, Mr. Teske?
A. I don't know, it would be guess work that is all I could do.
Q. You have seen it?
A. Yes, sir.
Q. Estimate it.
A. About 24 foot, something like that.
Q. Now, I might ask you, is there a road along the south line of Section 1 running east and west?
A. Yes.
Q. Crosses the river at four points, does it?
A. It only crosses two, it swings around the river bend.
1158 Q. Crosses there at your place?
A. Yes, sir.
Q. And runs to the south bank of the river then follows the south bank of the river around and crosses again over on the south line of Section 2, is that it?
A. Well, I don't know, I suppose so.
Q. Haven't you driven along that line?
A. Yes, I have driven across and I don't know nothing about the sections, whether it is 2 or 3.
Q. At the south line of the quarter, I will say then, that lies west of Krenz's land, is that right?
A. Yes.
Q. Now, what if anything happened to this bridge there by Krenz's in the spring of 1916, Mr. Teske?

A. It went down the river.

Q. It was taken out by the water and carried down the river to what point?

A. Where the other bridge crosses the river.

Q. At the south line of Section 2, the south line of the quarter west of Krenz's, is that right?

A. Yes, sir.

Q. Mr. Teske, do you know anything about this cut-off ditch that was made along here, 2 miles south of your place, along the south line of Sections 18, in Redpath, and 13 in Monson?

A. Yes.

Q. Have you observed that cut-off ditch in the spring to see how it operates?

A. Yes.

Q. What have you noticed about it?

A. Well, I know it don't open up as quick as the river bed does, it takes a week or ten days longer for it to, than the river does.

1159 Q. Why?

A. Because the sun ain't got no chance to—it is drifted full of snow and don't open up.

Q. The sun don't get into it?

A. No, sir.

Q. Mr. Teske, as far as your observation goes, has there been any less water in the old Mustinka river coming on around that bend to the north since that ditch was put in there than there was before, any less amount of water?

A. No.

Q. Has there been, as far as your observation goes, is there just as much water comes on around the bend of the old Mustinka river since that ditch was put in there as there was before?

A. Yes, sir, in the spring of the year it does.

Q. And in the summer when the water is high?

A. Well, I don't know whether it makes much difference or not.

Q. Have you noticed any difference?

A. Not as long as I have been there.

Q. Is there any less water, so far as your observation goes, that overflows to the north over into the Tintah slough and the Rabbit river since that ditch was put in there than before? You understand the question? Is there any less water that goes north into the Rabbit river now than there was before the ditch was put in?

A. No, I don't think so.

Q. Did you have any particular reason to observe the quantity of water going north into the Rabbit river in the spring of 1916 particularly along the east and west quarter line of Section 1, your north line and the north line of Krenz, Mr. Teske?

1160 A. There was about a foot and a half of water across the quarter then.

Mr. Bronson:

Q. When?

Mr. Palmer:

Q. In the spring of 1916?
A. Yes, sir.
Q. How did you happen to see it then, that is what I am asking you?
A. Well, the boy took them in in the morning and I went there in the evening.
Q. Took whom?
A. The children to school.
Q. One day in the morning and you went after them in the evening?
A. Yes, sir.
Q. What did you observe about the water there?
A. Going north.
Q. It was going north?
A. Yes, sir.
Q. Did you drive along the east and west quarter line of Section 1 then, is that what you mean?
A. East and west?
Q. Yes, north line of your land, is that where you drove?
A. I went northwest across the quarter, around Krenz's buildings.
Q. You didn't drive on the quarter line, you drove——
A. Across the fields, straight.
Q. And you say you saw a foot and a half of water going to the north there?
A. That is, in places.
Q. How was it, did that spread out more or less all along across there?
A. Yes, sir.
Q. Across the whole south part of the section, Section 1?
A. Oh, must have been 80 rods wide.

1161 Cross-examination.

By Mr. Bronson:

Q. How long do you say you have lived in Traverse county?
A. When I first *some* there was in 1892.
Q. Where did you live there then?
A. I lived around Wheaton.
Q. How close to Wheaton?
A. About a mile and a half.
Q. Which way?
A. East.
Q. On any particular section?
A. 16.

Mr. Palmer:

Q. 16 in East Lake Valley township?

Mr. Bronson:

Q. Section 16, in East Lake Valley?
A. I don't know whether they call that east or west.
Q. Anyway Lake Valley?
A. Lake Valley.
Q. How long did you live there?
A. About 10 years.
Q. Did you farm the land there?
A. Yes, sir.
Q. That would take you up to 1902, then where did you live?
A. I moved to North Dakota.
Q. Where?
A. La Moure county.
Q. Farmed in La Moure county?
A. Yes, sir.
Q. Near what town?
A. Litchville was my nearest town.
Q. Litchville, North Dakota?
A. Yes, sir.
Q. And were you there until the year 1909?
1162 A. Yes, sir.
Q. Then you went back to Traverse county and bought this land?
A. Yes.
Q. And you have owned this land ever since?
A. Yes.
Q. You have been along this Mustinka river from the cut-off ditch down to Wheaton at different times?
A. Yes.
Q. Can you say whether or not the lands there in 1892 from the cut-off ditch down towards Wheaton on each side of the Mustinka river were being farmed, farmers on them?
A. Yes, sir, on some of them.
Q. And were you acquainted with this land that you now talk about that you own in 1892?
A. Not that I know of.
Q. You hadn't been up there in that district in 1892?
A. Not that I know of.
Q. Had you been up in Redpath township from 1892 up until the time you bought the land up in Monson township in 1909, had you ever been up there?
A. In that time?
Q. Yes.
A. Yes, sir.
Q. You had been over that land some, had you, up to the year 1909, at diffe[illegible] times?
A. Yes [illegible] been through there, through the country.
Q. Drive across it?
A. What do you mean, across the——
Q. Across to Norcross, for instance?

A. Yes, I have been through there.
Q. Before you bought the land up there?
A. Yes.
1163 Q. And you have been across some after you bought the land up there?
A. Yes, sir.
Q. Now, after you bought that land in 1909, you have been troubled some with high water both in the spring and in the summer, have you not?
A. Yes, sir.
Q. And you had high water there several different years since you bought that land?
A. Yes.
Q. And in the spring of some years you have seen high water, flood water, covering not only some of your land but the lands surrounding your land, have you not?
A. Yes.
Q. Both to the north, south, east and west?
A. Yes.
Q. The land around where you own your farm is flat, level prairie land, generally speaking?
A. Yes.
Q. Your land is a little bit lower than the land to the southeast, is it?
A. No, I don't—that is, not where the buildings is on.
Q. Is some of the rest of it lower?
A. I don't know whether it is or not.
Q. Where do the floods come from that you have talked here about in your evidence, from which direction?
A. Well, they come from the east.
Q. And south?
A. I suppose, I don't know.
Q. You have seen where the waters have gone, have you not?
A. They come from the southeast and——
1164 Q. Do the waters come down from the north over your land?
A. They go to the north?
Q. Do they go to the north or come down from the north?
A. They go down to the north.
Q. The flood waters that you have seen in these years you have been there, when the *have* flowed have gone to the north?
A. Yes, sir.
Q. You live right close to this Mustinka river?
A. Yes.
Q. Your land borders on it?
A. Yes, sir.
Q. You have seen this Mustinka river then overflow its bank frequently since you have been living there?
A. On some places.
Q. Is there any place along your farm where you have not ever seen it overflowed?

A. Yes, sir.
Q. Where?
A. On the west side of my buildings.
Q. On the west side of your buildings?
A. A little northwest.
Q. Did it overflow in 1916 there?
A. No.
Q. Water was within its banks there?
A. Yes, sir.
Q. All the time you had the high flood water?
A. For a little distance.
Q. How big a distance?
A. I don't know.
Q. A little ways?
1165 A. Quite a little ways.
Q. How far, four or five miles?
A. No, I don't think so.
Q. Well, how many miles? How far, Mr. Teske?
A. Well, I don't know how far it is; it is around that bend.
Q. To the south—to the west and south, is that what you mean, or to the east, which way from your buildings?
A. On the north and little northwest of my buildings there.
Q. Are your buildings north of the Mustinka river or south of the Mustinka river, which way?
A. The east side, the river runs by my house on the east side.
Q. You spoke about a kind of a lake on your land, is that all on your land, the lake you are talking about?
A. There is a little of it on the other quarter.
Q. Whose quarter?
A. Walk's.
Q. And does it go on anybody else's land beside Walk's?
A. No, not where the water stands in.
Q. Does it extend northward?
A. Northwest.
Q. And how big is that?
A. That lake?
Q. Yes.
A. I guess it is close to half a mile long.
Q. And about how wide is it?
A. Oh, I don't know, 12 or 15 rods, more or less?
Q. And do bullrushes grow in it?
A. Some grow on the side, some rushes.
Q. Water standing there?
A. Yes, sir.
Q. In the summer sometimes?
1166 A. It — never been dry as long as I have been living there.
Q. Always been water in it?
A. Yes, sir.
Q. Water in it now?
A. Yes, sir.

Q. And do waters collect there in the spring, does a lot of water get in there every spring?

A. Yes, sir.

Q. In the spring of 1916, how close did the water come to your buildings?

A. Surrounded the buildings.

Q. You have got a barn there and a house and granary?

A. Yes, sir.

Q. And was there water in the barn?

A. No.

Q. How close to your barn?

A. Oh, within a rod or two.

Q. And at that time you say there was some water going over towards Tintah slough or Rabbit river through what they call the Tintah slough there?

A. Yes, sir.

Q. And is this Tintah slough north of you?

A. Yes, sir.

Q. And do the waters sometimes, as you have talked about, go north past your place into this Tintah slough?

A. Yes, sir.

Q. And at some places where you have seen it flow northward there in times of flood waters across the grade there into the Tintah slough through this culvert you have been talking about?

A. Yes, sir.

1167 Q. And in 1915 this county ditch #10 you say was completed and the embankment thrown up on the north side or south side of the ditch?

A. North side.

Q. And that made a road?

A. Yes, sir.

Q. And you put a culvert into that road?

A. Yes, sir.

Q. In the spring of 1916 waters were going through that culvert?

A. Yes, sir.

Q. And washed the culvert out?

A. Yes, sir.

Q. Carried it up into the field?

A. Yes, sir.

Q. And did the waters go over the road?

A. Yes, sir.

Q. Where the culvert was washed out?

A. Yes, sir.

Q. And go over the road anywheres else?

A. Not that I know of.

Q. And when the spring opened did the waters along that ditch on the south side of it come down towards your place from the east?

A. Yes.

Q. And did the ditch as it stood there with the embankment on the north side of it kind of keep the waters back from going north

as they formerly did and come down towards your farm as well as Krenz's farm?

A. It went across the road there where the culvert was.

Q. In years gone by, before this ditch was built, you had high waters there some springs?

A. Yes.

1168 Q. And you have seen the waters come up there and go past your place into this Tintah slough, some of them?

A. Yes.

Q. And you had seen flood waters over to the east from your place?

A. Yes.

Q. And you have seen some of those going across the road, haven't you, before the ditch was built, east?

A. Well, right there by the corner where the culvert was put in.

Q. Yes, but further east?

A. Not that I know of.

Q. Isn't there a bridge up at the northwest corner of Section 11 at the beginning of this ditch, some four miles east of your place?

A. Well, I don't know whether there is or not, I don't travel that——

Q. Did this ditch have any waters in it in the spring of 1916?

A. Yes, sir.

Q. Did you see waters going down in it?

A. Yes.

Q. This ditch enters into the Mustinka river right south of your place?

A. Yes.

Q. Did this ditch flood your land any?

A. Not that I know of.

Q. Did you see it flooding the land to the south, some of the lands right south of you, northeast quarter of Section 12?

A. No, I don't know that the ditch has anything to do with that.

Q. You didn't see that, yourself, at all; didn't make any observation on that or didn't notice anything about it?

1169 A. Well,——

Q. Was Krenz's farm flooded at all in the year 1916?

A. Yes.

Q. How much was his farm flooded?

A. In the spring of the year.

Q. 1916?

A. Yes, sir,

Q. And in the summer of 1916?

A. I don't know how much there was.

Q. Was there any water on it in the summer of 1916, on the Krenz place?

A. I don't know, it is all grown up in weeds, I couldn't say.

Q. Grown up in what?

A. Weeds and stuff. I don't know whether there is any or not.

Q. His farm is grown up to weeds?

A. Yes, sir, in 1916,

Q. Was there any crop put in?

A. I don't remember whether he put in any or not.
Q. Did you put in some in 1916?
A. Yes, sir.
Q. Did you get a crop in 1916?
A. No, not to amount to anything.
Q. What did you put in in 1916?
A. Put in some oats and wheat.
Q. How many acres of oats did you put in?
A. I don't remember.
Q. 5 acres or 10 acres?
A. About 20 acres, I guess.
Q. What else did you put in?
A. About 30 acres of wheat.
1170 Q. What else?
A. Put in a little barley and corn.
Q. How much barley?
A. Oh, a couple of acres, of barley.
Q. Do you own the southwest of 6, Redpath township?
A. Yes.
Q. And the southeast of 1?
A. Yes, sir.
Q. How much did you put in in 1915 on the land in crop?
A. I guess I put in most all of it.
Q. Some into wheat?
A. Yes, sir.
Q. How much into wheat?
A. Well, I guess altogether I had about 100 acres.
Q. How much in barley?
A. I don't know whether I had any barley or not.
Q. How much oats?
A. About 35 or 40 acres.
Q. Did you get a crop there in that year?
A. Yes.
Q. Cut it?
A. Yes.
Q. Harvested it and threshed it?
A. Yes.
Q. How much did the wheat turn out?
A. About 5 or 6 bushels.
Q. 1915?
A. Yes.
Q. And your oats turned out?
A. I don't remember any more.
Q. Get as much as 10 bushels to the acre?
1171 A. I got more than that.
Q. 20?
A. I had a little over 1700 bushels in about 35 or 40 acres.
Q. In 1914 did you put a crop in there?
A. Yes.
Q. How much did you put in?
A. I don't remember.
Q. Put any wheat in?

A. Yes, sir.
Q. 50 acres of wheat?
A. I don't remember how much I put in.
Q. Would you say less or more than 50 acres of wheat?
A. I guess I had in more.
Q. Did you have some barley in that year?
A. Yes.
Q. About how much barley? Did you have more barley than you did wheat?
A. I don't remember.
Q. Have as much as 50 acres do you think?
A. I don't remember of any kind how much grain I had in that year.
Q. Did you have some oats in that year?
A. Yes, sir.
Q. How many bushels did you get approximately?
A. I don't know.
Q. A 1,000, get as much as 1,000?
A. I don't remember.
Q. Would you say it was more or less than 1,000?
A. I could not make any estimation, I don't know how much I had in.
Q. Can't you give any estimate at all?
1172 A. No, sir.
Q. What you had in the year 1914?
A. No, sir.
Q. Did you have the land in crop in 1913?
A. Yes, sir.
Q. And in 1912?
A. Yes, sir.
Q. Had some wheat and some oats and barley?
A. Yes.
Q. How deep was the water over your place in the spring of 1916?
A. Going north?
Q. No, on your place, no matter which way it was going?
A. It was 4 or 5 inches, that is, around the buildings.
Q. How many acres did you have covered; all of it, except around the buildings?
A. No, just on the east side.
Q. Was there some on the southwest of 6?
A. Yes, sir.
Q. And about what time of the year was this?
A. In the spring of the year.
Q. March or April?
A. I think it was in March.
Q. Was the highest flood in March or later than that?
A. I don't remember.
Q. How long did it stay?
A. Well, all the way from a week to ten days.
Q. Then it would go off?
A. It would go down.

Q. Went down so you put your crop in?
A. Yes.
1173 Q. Water went off the land?
A. Yes, sir.
Q. How did it get off the land?
A. Drained off to the river.
Q. Some drained off to the river?
A. Yes, sir.
Q. Some went north over this culvert, you say?
A. Yes.
Q. And when that summer did you see some more high water there?
A. In 1915?
Q. 1916.
A. 1915 and 1916.
Q. When that summer of 1916 did you see some more high water there?
A. Along in the summer.
Q. In June or July?
A. In June I think it was.
Q. Did it get as high as it did in the spring?
A. No.
Q. How long did it stay?
A. Oh, I don't remember exactly.
Q. State as near as—did it stay as long as it did in the spring?
A. Somewheres around a week or so.
Q. And drained off again? It drained off, did it, to the river?
A. Yes.
Q. Every year you have been there when you had any wet season or quite a bit of rain you have seen this Mustinka river overflow, have you not, come out of its banks?
A. Well, not every year.
1174 Q. Saw it in 1915?
A. Yes.
Q. Saw it in 1914?
A. I don't remember.
Q. Saw it in 1916?
A. Yes.
Q. Saw it in 1910?
A. Yes.
Q. And 1911?
A. No, I don't think so.
Q. You say—did you see it in 1912, did you have a little overflow there in the spring of 1912 when the winter broke up?
A. I don't remember.
Q. Do you remember 1910?
A. Yes, sir.
Q. Was there much of a flood there in the spring of 1910?
A. Quite a little.
Q. Went away same as the rest of it?
A. Yes.
Q. Drained off?

A. Yes.

Q. When this ditch was put in there, were you assessed for that ditch; this county ditch #10, were you assessed for that?

A. I guess so.

Q. Don't you know?

A. Yes.

Q. Did it help your farm?

A. To some extent.

Q. How?

1175 A. Well, it drained it off last winter as soon as the river goes down.

Q. Farm dried out?

A. Yes, sir.

Q. Dry all summer?

A. Yes, sir.

Q. Ever since last spring?

A. Yes, sir.

Q. Put your crop in this year?

A. Yes, sir.

Q. Got it in good season?

A. No.

Q. Late spring?

A. Yes, sir.

Q. You are acquainted with this cut-off ditch, you say?

A. Yes.

Q. Did you see them build it there?

A. Yes, sir.

Q. Was there water in this ditch in the spring of 1916 when you saw this high water?

A. Yes, sir.

Q. Same time you saw water in the Mustinka river?

A. Well, not at the same time, the Mustinka river opened before the ditch did.

Q. Did you when the water was high flowing over into the Rabbit river, over this Tintah slough, as you say, see this county ditch?

A. I suppose so, I wasn't out there.

Q. The whole country was overflooded at that time around there?

A. Yes, sir.

1176 Q. Lots of water?

A. Yes.

Q. Over all this Delta zone we have been talking about to some extent in Redpath township?

A. Yes, sir.

Q. You could see the water by looking off from your farm to the south?

A. Yes, sir, and to the east.

Q. South and east?

A. Yes, sir.

Q. This ditch you speak about, this cut-off ditch, you think carried water in faster than the old Mustinka used to?

A. Well, I don't know whether it does or not.

Q. It ought to?
A. Yes, it ought to.
Q. Now, in any year that you have high water there, Mr. Teske, how high does the water get on your farm or any part of your farm before it starts to go over into the Rabbit river or over this grade into the Tintah slough?
A. Well, as soon as the river backs up it runs across and goes right down to the Rabbit river.
Q. As soon as the river backs up and overflows its banks and gets into your farm?
A. Yes, sir.
Q. Then it goes over into this?
A. Coulee or lake, what you might call it, then it goes north.
Q. And when that starts back and gets lower the river itself carries it off, the Mustinka river, the flood water, does it?
A. Well, after it is way down.
Q. Way down?
A. Yes, sir.
1177 Q. Whenever the river doesn't overflow its banks very much it carries off flood waters, doesn't it, the Mustinka river?
A. Yes.
Q. Down towards Lake Traverse?
A. Yes.

Redirect examination.

By Mr. Palmer:

Q. Mr. Teske, do you know anything about what counsel refers to in the question as this Delta zone? Do you know what he refers to; do you know what it means, this Delta zone?
A. No, I don't.
Q. I didn't know before about these trips that you made to Norcross that counsel asked you something about, in 1892 and from then on, while farming this land east of Wheaton, whether you went northeasterly across the country there over to Norcross. Did you make some trips across there to Norcross?
A. Yes, sir, I made some trips there to Norcross.
Q. What years?
A. I don't remember.
Q. Was it soon after you went onto this land near Wheaton in 1892?
A. Yes, it was somewheres around 1894 or 1895, I don't know which.
Q. Did you go through the southern portion, central portion of the town of Clifton?
A. I went through Clifton, yes, sir.
Q. At what season of the year did you make those trips?
A. In the winter.
Q. Did you ever go across there in the spring or over into
1178 Clifton in the spring of those years?
A. Well, I drove through there in the spring once in 1892.

Q. What was the occasion of your going there then?
A. I was looking around to buy a yoke of cattle.
Q. A yoke of oxen?
A. Yes, sir.
Q. Did you drive around in that country in there in Clifton township?
A. Well, I drove through it.
Q. Did you see at that time water on the land?
A. Oh, there was some pot-holes.
Q. Any more than other parts of the county?
A. No, not that I know of.
Q. What was the condition of the roads, could you drive through there all right?
A. I don't remember that we found—seen any graded roads, it was all prairie at that time.
Q. All prairie roads?
A. Yes, sir.
Q. And you drove those prairie roads without any trouble?
A. Yes, I didn't have any trouble that time I drove there.
Q. How was the country settled in there in 1892?
A. There was quite a few buildings up.
Q. Were the farms being cultivated?
A. Some of them.
Q. Crops raised?
A. Some of them.
Q. How did they compare then with the other parts of Traverse county in those days?
A. I don't know.
Q. I don't know as you understand the word compare.
1179 How was it, was it like the rest of the county in the matter of settlement and cultivation and roads?
A. Yes, sir.

Recross-examination.

By Mr. Bronson:

Q. Roads just as good as they were down near Wheaton, weren't they?
A. Well, they was all prairie roads, I didn't see any difference.
Q. Drove across country, were they no graded roads then?
A. Not that I know of.
Q. Didn't see any?
A. No, sir.
Q. Did you go to Norcross?
A. Not in 1892. I didn't go to Norcross in 1892.
Q. Where did you go?
A. Went around to buy a yoke of oxen.
Q. Where did you go?
A. To Clifton Township.
Q. You went across Twelve Mile Creek?

A. Well, I suppose I did, I didn't know what it was at that time.
Q. You know what it is now?
A. Yes, sir.
Q. And did you go across Five Mile Creek?
A. Not that I remember of at that time.
Q. And what time of the year was this?
A. It was in the spring.
Q. Were the farmers seeding?
A. No*t*, not yet at that time.
Q. Any snow on the ground?
1180 A. No, I don't remember whether there was or not.
Q. Country around there was hilly or flat?
A. Oh, flat.

THOMAS HEGGEN, being sworn in behalf of defendant, testified as follows, examined by Mr. Palmer:

Q. How old a man are you?
A. I was 53 yesterday.
Q. Where do you live, Mr. Heggen?
A. A mile north of Wheaton, Minnesota.
Q. Give a description of your land.
A. Southeast quarter of Section 7, Township 127, Range 46.
Q. What is the name of the township?
A. East Lake Valley.
Q. As I understand it, they call the real township of Lake Valley, East Lake Valley, and then westerly to the lake is another part that is called West Lake Valley?
A. Yes, sir.
Q. And that same thing is true of the township of Monson?
A. Yes, sir.
Q. And the same thing is true of the township of Taylor?
A. It is.
Q. How long have you lived on this southeast quarter of Section 7, East Lake Valley?
A. I started to live there in 1889 in the fall.
Q. Have you resided there continuously ever since?
A. Continuously ever since, yes, sir.
Q. And your business has been the farming and cultivation of that land?
1181 A. Yes, sir.
Q. Does the Mustinka river pass through your land?
A. Right through it, angling.
Q. Which portion of your land?
A. From the middle of the east line to the southwest corner.
Q. And is it upon your farm that this cut-off was made in the last part of the Mustinka state ditch which has been referred to here as the Heggen cut-off?
A. Yes, sir.
Q. Is that the first cut-off after the ditch leaves the big cut-off at the north, east and west cut-off?
A. Yes, that is the first.

Q. Now, Mr. Heggen beginning with your first acquaintance of this land, I will ask you whether there have been any overflows of the land along the valley of the Mustinka river from the north line of Section 23, Township of Monson and down to or beyond the Milwaukee railway track?

A. I couldn't place Section 23 in Monson so you will have to give me some other description.

Q. Well, it is about the point where the Swedish church is in the town of Monson.

A. Yes, I am well acquainted there.

Q. Have you been well acquainted with the land all along the Mustinka river valley between the two points that I have mentioned?

A. Yes, sir.

Q. Now, what about the overflow of the lands there, Mr. Heggen?

A. Well, it seems that the water rushes down on the flat down by the Swede church and it spreads over that flat and it seems to be an obstruction that holds it from getting down to the lake fast enough before it spreads and one part of that is in the Milwaukee railroad track on the grade and the only way that water can
1182 get through is the opening of that bridge on the Milwaukee railway, and there has been times that water spread over the prairie about 2 miles north of Wheaton, 2 miles wide north of Wheaton along the railroad track and can't get across and that is the only cause I can see that it spreads over the flat so much. Since they made those ditches, north and south ditches, why it is still more obstructed to bring the water down to the lake faster because all those road grades is built up high, and there is anyway two ditches, ditch 27 and I think ditch 36 running north and south, and this special ditch 27, quite a road grade, dirt throwed up between 5 and 6 feet high over the level of the prairie and the only way that water can get through is through the little bridge right in the channel of the river, like it was in the spring of or in the summer of 1916, rather, it spread all along that dirt piled north and it had to get around back around and get down to the bridge across the channel.

Q. Before there were any ditches in there of any kind, Mr. Heggen, the Milwaukee railway grade operated to set the water back more or less upon the lands above?

A. Yes, sir.

Q. Was there some area flooded down southwest of the railroad track, down below the railroad track?

A. To some extent it is.

Q. What set the water back there, do you think?

A. Why, the bends in the river, I suppose, partly below there.

Q. Some narrowing of the valley there?

A. Why, it is——

Q. To some distance below the railroad grade?

A. Of course, it is only a couple of times I seen it spread
1183 below the bridge. It has very high banks below there and it is very seldom it spreads over.

Q. What years did you see it spread over the lands below the bridge?

A. First it was in 1897 in the spring, as high as the water has

ever been since I come to live on there, about a foot and a half higher than it was in the spring of 1916.

Q. And again in the spring of 1916, 1897 and 1916 then, do I understand you, were the only years that you have seen the lands flooded below the railroad bridge?

A. Yes, sir.

Q. Now, the lands above and extending clear up to the Swede church, how frequently have those been flooded since you have lived there?

A. Pretty nearly every year.

Q. And I suppose the extent of the spreading out of the waters varied with the wet conditions in the spring?

A. Yes, sir.

Q. You say that in 1916, Mr. Heggen, there was a ditch, called county ditch #27, constructed north and south?

A. From my place.

Q. North from your place?

A. Yes, sir.

Q. And that comes in on your east line?

A. East line.

Q. And that is what is marked on the map, Defendant's Exhibit 7, as county ditch #27?

A. Yes, sir.

Q. When was that constructed?

A. It was completed this year.

Q. Where did they start to build that ditch, which end?

1184 A. From the river, north.

Q. From near the southeast corner of your land?

A. In the middle of my east line, yes.

Mr. Bronson:

Q. North to where?

A. Into the town of Monson, Taylor and I don't know, a branch ditch connected at that time——

Mr. Palmer:

Q. When did they start to build that, what part of 1916?

A. It was — last of June or first of July, in there.

Q. How big a ditch is that?

A. At my place it is around 30 feet at the top in places and I think up at the deepest cut is about 12 feet deep, at the beginning there.

Q. And what has been done with the dirt that is excavated from that?

A. That is throwed right on the road, section line.

Q. And any provisions made there for the water getting through that embankment?

A. Not only the old channel and they are preparing now a little cut-off ditch about 5 rods north of the channel of the river supposed to handle this ditch water coming from the north.

Q. Will it handle this ditch water coming from the north, do you think?

A. I don't know, they haven't tried it yet, I couldn't say.

Q. There was no opening then made in this embankment until this year?

A. No, sir.

Q. And what time this year?

A. Why, it was partly there last fall, partly dug out last fall, started to dig out part of it.

Q. The other ditch that you speak of is county ditch #36?

1185. A. 36, I think.

Q. That is up on the east line of Sections 27, 22 and 15 in the town of Monson?

A. I think so, yes, sir; it is west of the Swede church.

Q. When was that built?

A. Last fall.

Q. 1916?

A. Yes, sir.

Q. Did they start to dig that at the river?

A. Yes, sir.

Q. About how large a ditch is that?

A. Well, I couldn't say as to that *that*. I went through there but I can't remember. I didn't take any notice.

Q. It is an open ditch?

A. Yes, sir.

Q. And the banks thrown out?

A. All the dirt from the ditch, I guess.

Q. Across the river valley there?

A. Yes, sir.

Q. Any provision made for letting the water through that bank?

A. The river water?

Q. Yes.

A. No, not that I know of.

Q. Now, the Mustinka ditch where that follows the channel down from the Swede church and the excavation thrown out on the banks, how does that affect the water, Mr. Heggen, flow of the water?

A. It seems that small openings are made wherever there is a natural drainage of the river and when it spreads out on that flat it seems all the dirt on the sides hold it back and couldn't get into the main channel fast enough.

1186 Q. Does the main channel take care of it?

A. Never did.

Q. You remember when this Mustinka ditch was constructed down through there?

A. Yes, sir.

Q. I believe it was in 1913?

A. I think it was, yes, sir.

Q. That is, down past the railroad bridge. Have you observed the water there in the springs of 1914, 1915, 1916 and 1917?

A. Yes, sir.

Q. I want to ask you, Mr. Heggen, whether there has been any less water there in those springs since this ditch was made than there was before this ditch was made?

A. Been more water.

Q. There has been more water?
A. Yes, sir.
Q. As to the length of time that it would stay on the lands, has it stayed a longer or shorter time?
A. Stayed longer.
Q. You think it has stayed longer?
A. Stayed longer.
Q. In other words, Mr. Heggen, so far as the flooding of those lands along the Mustinka valley from the Swede church on down to the railroad track are concerned, has this Mustinka state ditch been any help to them?
A. It has been a damage to me.
Q. How is it to the other lands along there?
A. It has served them the same as it does me, it looks.
Q. It looks that way to you?
A. Yes, sir.
Q. It hasn't been any help to those lands along there at all
1187 in the matter of preventing their flooding?
A. Not along the river that I can see.
Q. In 1917, this last spring, did you have flooding along there?
A. Yes.
Q. The same as in previous years?
A. This spring it was—well, I never had my banks on the land overflooded only the year 1897 until in the year 1916 and 1917, going across mine and over on Steidel's and across to the railroad track.
Q. Where is Steidel's land?
A. West of mine, Section 7.
Q. That is, he has the southwest of 7, has he?
A. Yes.
Q. About the water going across this railroad grade in 1916, do you remember about that?
A. Yes, sir.
Q. What was there about that?
A. Well, it washed out part of the, quite a bit of the grade right close to the bridge and north about eighty rods north of the bridge and had to raise the track to make filling underneath the ties and made more embankment for the water to be held back.
Q. Did they put in a trestle there, a bridge?
A. They did north there, about 80 rods.
Q. About 80 rods to the north?
A. Yes, sir.
Q. This water when it went through under the grade or washed out the grade in 1916, which way did it go?
A. Well, I was down at that bridge and looked at it and when it went through the bridge it seems as though it went both north
1188 and south. It didn't go straight down the river, it seemed to my view that the water below the bridge was about a foot and a half lower than above the bridge at that time.
Q. You mean that the railroad bridge seemed to dam the water back?
A. The railroad grade, yes, sir.

Q. Is there a wagon bridge there close to the railroad bridge, just below it?

A. Yes, sir.

Q. Did you see that at the time of the high water in 1916?

A. Yes, sir.

Q. How high was the water there?

A. Well, I don't know if I was there near the high water mark but it was, I think, half way up on the rail, about 2 feet or so above the bridge.

Q. That was in 1916?

A. Yes, sir.

Q. And did the grade there seem to dam the water up to the wagon road grade and bridge?

A. Yes, because that is so much shorter than the railroad bridge.

Q. The wagon bridge was not so wide as the railroad bridge?

A. No.

Q. And whether there was ice in the river at that time, Mr. Heggen?

A. Not when I seen it, it was clear, no ice.

Q. I want to ask you about the crop conditions in 1916, your crop in 1916, what can you say about that?

A. Well, I didn't have any crop.

Q. Why not?

A. I couldn't seed it in. The fall of 1915, anyway at my farm, was so wet and rainy that I couldn't hardly get my grain
1189 threshed that I raised in 1915, and in the opening of the spring of 1916 it was a lot of snow during the winter of 1915 and opening up it was a cold, rainy spring and at the highest points of my land I couldn't get on and seed it. There was no water standing but it seems as though the soil was dead, couldn't get onto it and seed it.

Q. In 1916?

A. I had a few acres of oats but——

Q. How was it in 1915, did you have a flood there in the spring?

A. 1915 it didn't hurt me much, no; it didn't overflow my land in 1915.

Q. Did it overflow any of the lands along the river there?

A. It maybe was up in a little bit of it, a portion of it, but not to make any damage. The damage I had in 1915 was in harvest when the rain started, excessive rain started in, and it held me from getting my grain, part of it.

Q. And the summer of 1916, did you have a flood there?

A. If I can recollect right, the field was lying there—I couldn't plow it in the fall of 1915 and I couldn't get onto it in the spring of 1916, it was all flooded, and after it got off into the river channel, why, it was so sour and dead you couldn't do anything with it.

Q. Do you remember of you having another flood in the summer of 1916 and the water coming up again some?

A. I can't remember distinctly but I think we had a later flood in 1916.

Q. In 1917 how was the spring there?

A. Overflowing again, the banks.
Q. And about the usual flood conditions?
A. It was more than usual. We never had any floods like
1190 that since the year 1897 up until 1916 and 1917.
Q. Was it as bad in 1917, the flooding there, as it was in 1916 in the spring?
A. Just about the same, not quite as bad but just about the same.
Q. How did that affect you in getting in the crops this last spring?
A. It opened up kind of bad but it dried up so I got in my crops this year.
Q. How were you, later than usual?
A. Late, yes, sir.
Q. It made the planting of the crops late?
A. Yes, sir.
Q. Now, the purpose in putting in this last part of the ditch, as you understand it, was to do what, Mr. Heggen?
A. I don't understand.
Q. What was the reason for putting in the last part of the ditch, this new part?
A. You mean, dredging the river?
Q. Yes.
A. Well, the intention was, I suppose, to carry off the water faster down from that flat.
Q. By flat you mean this land——
A. From the railroad track north to the Swede church.
Q. Now, has it done that, has it been a success?
A. No, sir.
Q. Has it been a failure?
A. Been a failure, yes, sir.

Cross-examination.

By Mr. Bronson:

Q. You have had more trouble with floods in the last few
1191 years than any years you have been there excepting 1897?
A. Yes, sir.
Q. In the early years when you lived there you were not troubled much with high water except the year 1897?
A. No, sir, not that I can recollect.
Q. That is, the farmers along in that community, with the sole exception of 1897, that you say was the highest you ever saw?
A. Yes, sir.
Q. You were not bothered very much with floods?
A. No, not on my lands.
Q. Well, on other lands that you observed around there?
A. Not as generally as those last years.
Q. In other words, there has been a noticeable difference between the flood waters in that district that we have been talking about from what they were in the early years that you lived there?
A. Yes, sir, except that one year.
Q. The year 1897?

A. Yes, sir.

Q. In other words, conditions along in that flood plane have been getting worse instead of better as far as floods are concerned?

A. Yes, sir.

Q. And you as well as other farmers who live in that district generally have been damaged considerably by those ditch constructions, have you not, those state ditch constructions?

A. Well, I don't know about the state, I understood it was county ditches they have been establishing.

Q. Well, you call this big ditch in the Mustinka river a
1192 state ditch, do you not?

A. Yes, sir.

Q. And that these ditch constructions, instead of benefiting you have harmed you, haven't they?

A. It has those last two years. Of course, the rain has been so abnormal that we couldn't compare these last two years with any other years.

Q. That is, you have had unusual conditions the last two years?

A. Yes, sir.

Q. But you haven't had unusual conditions this year?

A. No.

Q. The year 1917 has been a dry year?

A. Since the flood was gone in the spring, yes, sir.

Q. And you didn't have any unusual amount of snow last winter?

A. No, sir, not so very unusual, no.

Q. And yet you had a flood this spring on that plane down there, flooding your land?

A. Yes, sir.

Q. Just about as much you say as the year 1916?

A. Yes, sir; a little lighter, a little less.

Q. In an ordinary year years ago with a year like 1917 you would not be bothered that way, would you?

A. I don't know, I couldn't account for it, but it flooded me the last two years. I blamed it onto the excessive rains that we had, unusual years for rains.

Q. But you don't blame 1917 for that, do you?

A. No, sir, not since the opening of the spring.

Q. In 1915 you had floods there and the floods went away, drained off?

A. Yes, sir.

Q. And in 1916 you had floods and the floods drained off
1193 and went away?

A. Yes, sir.

Q. And 1917 you had floods and the floods went away?

A. Yes, sir.

Q. Drained off?

A. Yes, sir.

Q. Did you say you thought it was the purpose of this state ditch to carry off the waters faster?

A. Certainly would look that way.

Q. Did you think that was the purpose?

A. I think so, yes, sir.

Q. And do you think that this state ditch does carry waters faster than the old Mustinka river did?

A. Well, sir, I cannot see it that way in high water.

Q. I am asking you the question whether or not the Mustinka state ditch carries more water than the old Mustinka river did, as it goes by your farm, or has it got as much capacity as the old Mustinka river?

A. It is defined with the dirt banks so it can't spread out, of course, like the old Mustinka river.

Q. The Mustinka state ditch is bigger, isn't it, than the old river?

A. It is deeper, deepened some.

Q. There is a cut-off ditch now?

A. Yes, sir.

Q. The water formerly used to go around the cut-off?

A. Yes, sir.

Q. It goes straight through now?

A. Yes, sir.

Q. Do you think it would go faster through the cut-off than around the old river?

1194 A. Yes, sir, it is bound to.

Q. Were you down to the legislature along in 1909 and 1910?

A. I was here, yes, sir.

Q. And did you go before the committee?

A. Yes, sir, I remember that.

Q. And give some testimony there?

A. Yes, sir.

Q. And you appeared before the committee for the purpose of getting this extension, didn't you?

A. Yes, sir, but if you look up my testimony I don't think it looks that way.

Q. What was your testimony?

A. I can't remember it.

Q. And some other farmers appeared with you?

A. Yes, sir.

Q. Before the committee of the legislature?

A. Yes, sir.

Q. And at that time this first ditch was in, this first state ditch was in, wasn't it, up west of Norcross?

A. I think it was, I wasn't much acquainted with that country.

Q. You knew about a ditch being in there?

A. I heard about it.

Q. And at the time you came down to the legislature your lands had been flooded some, hadn't they?

A. I think my testimony will show they wasn't flooded.

Q. It was your testimony your lands were not damaged any?

A. Not with high water, no.

Q. And it was also your testimony when you appeared before that committee that this ditch, this first state ditch, did not bring any waters down in that flood plane you have been talking about?

1195 A. I couldn't remember as to that.

Q. You won't say whether you said one way or the other on that?

A. No, sir, I couldn't remember.

Q. You have a great number of ditch constructions east of you, have you not?

A. Yes, sir.

Q. And you have some ditch constructions running by your farm east of you northward?

A. Yes, sir.

Q. All of these ditch constructions serve to bring water into the Mustinka river, do they not?

A. Yes, sir.

Q. And they all serve to bring water faster into the Mustinka river?

A. I suppose that is the intention.

Q. And isn't it a common observation that a ditch will carry water faster than no ditch, or not?

A. Yes, sir.

Q. When the spring comes and the winter snows melt, spring rains come, will these ditches carry off water faster into the Mustinka river than they would in a state of nature?

A. That is hard to answer because in a natural condition of the lay of the land it wouldn't have any obstruction across the prairie to get into the river.

Q. No obstruction?

A. No, sir.

Q. It is your opinion therefore that the water would come faster without the ditches than with the ditches?

A. Excess floods, yes, sir.

Q. The excess flood?

A. Yes, sir.

1196 Q. In an excess flood the ditch don't serve to carry all the water off?

A. Oh, yes.

Q. But not as much as in a state of nature?

A. I mean in excess rains and floods over the prairie——

Q. In 1916 you had a heavy rainfall, did you not?

A. Yes, sir.

Q. And in the summer of 1916 you had a flood, did you not, on this land you talked about?

A. Yes, sir.

Q. In the summer of 1916, of course, there wasn't any snow and there wasn't any ice in these ditches, that is true?

A. Yes, sir.

Q. And with excessive rainfall falling on this territory covered by those ditches we are talking about, would these ditches carry off the rainfall faster or would the natural conditions carry it off faster?

A. I suppose the ditches would if it comes down in a moderate way from the fall of the rain.

Redirect examination.

By Mr. Palmer:

Q. Mr. Heggen, one part of your testimony I don't understand. You spoke about seeing water up two feet on the rail of the bridge.

A. Did I say two feet?

Q. Now, did you mean the bridge up by your place or the bridge down by the railroad bridge, below the railroad bridge?

A. I had in my head, I know at my place it was past the first rail on the bridge and maybe I got that mixed up; that is the one
1197 I referred to. I was down to the railroad track and I know that bridge, the road bridge west of the railroad bridge is a good deal lower than the railroad bridge and it was very close up to the stringers of the railroad bridge.

Q. Do you know anything about how high that water was on that wagon bridge there below the railroad bridge in the spring of 1916?

A. When I was there it was—I can't remember now distinctly how high it went under that bridge, but it was covered from both sides so you couldn't get onto the bridge.

Q. That is, the approaches of the bridge?

A. Yes, sir.

Q. But when you spoke about it being two feet above the rail of the bridge, you meant the bridge at your place, did you, or near your place?

A. That is what I had in my head.

(At this time recess was taken until October 1, 1917, at 10 o'clock A. M.)

1198 October 1, 1917, at 10 a. m.

FREDERICK H. BASS, sworn in behalf of defendant, testified as follows:

Examined Mr. Palmer:

Q. Your residence, Professor Bass?

A. Minneapolis, Minnesota.

Q. How long have you lived there?

A. 16 years.

Q. Your occupation?

A. Civil engineer.

Q. How long have you been such?

A. About 20 years.

Q. Your age?

A. 42.

Q. From what institutions are you a graduate?

A. Massachusetts Institute of Technology, graduated in 1901.

Q. Have you a degree from the Massachusetts Institute of Technology?

A. Yes, sir, Bachelor of Science.

Q. Are you a member of the American Society of Civil Engineers?

A. Yes, sir.

Q. How long have you been such?

A. Since 1907.

Q. Do you hold some official position in the State of Minnesota?

A. I am a member of the engineering faculty at the University of Minnesota and have been for the last 16 years continuously.

Q. What is your title on the University faculty?

A. My correct title in the University is Professor of Municipal and Sanitary Engineering.

Q. Has your study of engineering included the study of Hydraulics and hydraulic engineering?

A. Yes, sir.

1199 Q. Have you practiced your profession aside from your work in the University of Minnesota?

A. Yes, sir.

Q. Along what line and to what extent?

A. Might I enumerate some of the work?

Q. Yes.

A. Before my graduation as already mentioned I was employed by the Metropolitan Water Board of Massachusetts on investigations for new water supplies for the metropolitan district of Boston for a period of between three and four years. During that time I made, under the direction of the chief engineer, various calculations concerning water supply and rainfall, run-off and storage measurement and surveys of streams and reservoir sites, construction of reservoirs, dams, aqueducts, channels, swamp drainage and evaporation. I thereupon returned to the Institute of Technology and graduated two years later, and I was again for a few months working under the Metropolitan Water Board on similar work for several months before coming to Minnesota. While a student during the last period at the Institute of Technology, I made an investigation of the drainage of Fresh Pond marsh near Boston for a provate concern. Since 1901 I have been in Minnesota. From 1907 to 1914 I was engineer and director of the engineering division of the Minnesota State Board of Health and in this capacity I made many trips through the Red river valley at various times of the year so that I am somewhat familiar with general conditions; their problems in water supply and especially in sewerage required a study of run-off in certain of these streams particularly in the Ottertail and Red Lake rivers and to some extent of Big Stone lake at Ortonville. Since coming to Minnesota I have also had one water power investigation in the Red river valley and one drainage investigation in North Dakota in the Red river vall-y. 1909 I made a detailed topographical and hydrological survey of Lake Mille Lacs, Minnesota, as a possible source of water supply from Minneapolis, making a rather extensive examination of many rainfall, evaporation and run-off measurements in Minnesota. Since 1914 to the present time I have been in the private practice of engineering as well in Minnesota, Iowa, North and South Dakota, and my problems have been principally water supply and sewerage projects for municipalities and these, as I have stated, often require studies of run-off and sometimes rainfall.

1200

Q. And I take it that during all of that time you have kept up your work at the University?

A. Yes, sir.

Q. And along what particular lines of instruction does that work run?

A. The lines along which I give instruction at the University are municipal and sanitary lines, along the same lines as those which I have enumerated as doing in practise. Up to within two years ago I also gave the instruction in hydraulic engineering, all hydraulic engineering.

Q. Have you made an examination and study of the region involved in this action?

A. Yes, sir.

Q. Wil you state when and in a general way the extent of that examination?

A. I first went into the field on the dates May 9, 10 and 11, 1917, and in those three days, by driving in an automobile and walking, gained a general idea of the Mustinka drainage area and of the ditch construction in the Mustinka drainage area, of Lake Traverse and of the Bois de Sioux valley, to a point a little further north than Fairmount.

Q. With what particular object in view did you make this first or preliminary examination?

A. To gain a general idea of the topography and the hydrological features of the area concerned.

Q. By whom were you employed?

A. The attorney general of Minnesota.

Q. When next did you make an examination of this area and to what extent?

A. From May 27 to May 31, inclusive, I was in the field, examining at that time — considerable detail the Mustinka state ditch from its outlet up to its source near Norcross. I examined both sections of the ditch. I rode across the so-called delta zone a number of times east and west and north and south and interviewed a number of settlers in regard to the history of the flooding of the area, etc. I went through the towns of Norcross and Herman, and thence easterly into a part of the moraine region, thence southerly to Moose Island and back to Wheaton. Then I made a trip from Wheaton to White Rock, stopping there to make some current-meter measurements of the Bois de Sioux, passing under the bridge just
1201 east of White Rock in the road across the valley at that point, examining the topography within the village of White Rock and the conditions as to the road crossing the valley at White Rock; noticed particularly the flood channels extending northerly from this road along the flood plane of the Bois de Sioux and the evidence of wash-out on this road. Thence along the westerly edge of the flood plane of the Bois de Sioux to Fairmount, thence to the east and southerly along the easterly edge of the flood plance, back to Wheaton. I then made a rather careful examination of Lake Traverse itself, its shores from Wheaton southerly to Browns Valley, particularly stopping at one point where it was reported a highwater mark has been chiseled in a boulder, to Browns Valley then examin-

ing the westerly shores of Lake Traverse and going up over into the drainage area tributary to Lake Traverse in South Dakota, traveling to a point a little further west than New Effington and returning easterly across this area to Wheaton. During those trips a good many photographs were taken and a good deal of ground covered on foot.

Q. Did you make a particular examination of this Mustinka state ditch itself at this time?

A. Yes, sir.

Q. How?

A. I walked along the banks of it at intervals from its outlet to its source. I suppose that altogether I might have walked four or five miles along it to determine the character of it and its relation to the original river, so far as that was discernable.

Q. And the parts which you did not actually traverse, did you observe them so that you know their character?

A. I observed those from the road, driving in an automobile.

Q. And in that manner did you cover the entire length of the ditch from its source to its outlet?

A. Yes, sir.

Q. Did you cause any work to be done or surveys to be made under your supervision Professor Bass, upon this second trip?

A. Yes, sir.

1202 Q. What did you have done?

A. I requested the attorney general to employ a surveyor, which he did, employing Mr. O. B. Nelson, who made certain surveys under my direction, surveys of the Mustinka drainage area and of the whole drainage area tributary to Lake Traverse and the Bois de Sioux valley, in those surveys making many profiles of streams and cross-sections at various points which were considered critical.

Q. Did you make any further examination of this area?

A. On June 15 to 18, inclusive, I was in the field and during that time examined the southerly portion of the Mustinka drainage area, driving from Graceville through Johnson and Herman to Elbow Lake for the purpose of making observations in regard to the limits of the drainage area. I had some reason to doubt the accuracy of the drainage area shown on Exhibit A submitted in the complaint and the purpose was to confirm or disprove those doubts. Later surveys were made by Mr. Nelson of this area. I then from Elbow Lake drove westerly to the Mustinka river and up the western side of the Mustinka to its source, the upper Mustinka to its source.

Q. To its source?

A. To its source.

Q. Where?

A. In Section 29, Township 131, Range 43.

Q. That is the town of Asstad in Ottertail county, Minnesota?

A. Yes, sir, in Ottertail county, Minnesota; then driving south along the westerly side of the river to the town of Wendell, examining the territory between the Mustinka river and Upper Lightning Lake, then from Wendell driving westerly and southerly and crossing the Rabbit river drainage area through Tintah and C Campbell to a point west of Campbell, thence southerly back to Wheaton.

Q. Did you on any of these trips make a study of the confluence of the Rabbit river with the Bois de Sioux river in Section 34, Township 131, Range 47?

A. Yes, sir, I examined that confluence and noted conditions there.

Q. Did you examine the source of the various tributaries of the Rabbit river and the ditching operations that had been made into them?

A. I noticed that the Rabbit river had a number of sources in the eastern part of this drainage area. Lightning lake is one
1203 source, Ash lake in the township of Lawrence, Grant County, is another source, and there are various small streams in that part of the drainage area flowing south and then turning west and then turning northwest, going into the Rabbit river. There is another source of the Rabbit in the Tintah sloughs in the townships of Tintah and Taylor, principally in Traverse county. There are other tributaries from the northerly portion of Rabbit river drainage area.

Q. You made a study of all of those, did you, and examination of them?

A. I made an examination of them.

Q. Did you make some examination of the conditions north of the confluence of the Rabbit river with the Bois de Sioux river between there and Wahpeton?

A. Yes, sir.

Q. These surveys in which you say field work was done by Mr. O. B. Nelson, do you mean he had the general charge of the field work and carried it on with the help of some assistants?

A. Yes, sir.

Q. Were the various surveys and the plats and maps thereof made under your supervision and direction?

A. Yes, sir.

Q. And I suppose, were examined and approved by you, before their final draft?

A. Yes, sir.

Q. Mr. Bass, what is Defendant's Exhibit 6?

A. This is a map of the drainage area of Lake Traverse and part of the Bois de Sioux river.

Q. How are the limits of the drainage area marked?

A. By a dotted line, shaded with blue.

Q. How were the boundaries established?

A. They were established in part by the use of United States Geological Survey maps, where those were available, and where they were not available by instrumental surveys by Mr. Nelson, notably in the southern part, south of Graceville and in the westerly part of the drainage area in Roberts county, South Dakota, and Richland county, North Dakota.

Q. What are the brown lines?

A. The brown lines are contour lines at 5 foot intervals
1204 generally.

Q. And the elevations there marked, I take it, are elevations above sea level datum?

A. Elevations above sea level; all elevations here were carried from United States bench marks.

Q. Bench marks established by what branch of the United States service?

A. Some of them were established, the most of them were established by the United States Geological Survey, some of them I believe were established by the United States Coast and Geodetic Survey, but they have all previous to this survey been well tied together and they are correct elevations published by the United States Geological Survey.

Q. Did you make a study of the past geological history and formation of this region, Professor Bass?

A. To some extent.

Q. From a geological standpoint what is this territory, material here?

A. This territory is described by geologists, most of it as being a part of the beds of the prehistoric lake, known as Lake Agassiz, which was the result of the melting of the glacier which retreated to the north and which lake found its overflow to *to* the south at this point through the canyon of Lake Traverse and Big Stone lake. As the glacier retreated to the north the lake has successive levels, successive lower levels, leaving marks in beaches at several places on both sides of the present lake. Finally, as the glacier retreated to the north and the streams flowing south diminished somewhat in volume, the little Minnesota river, which also formed an outlet of the glacier, built up a sort of a delta between Lake Traverse and Big Stone and stopped the outlet there and the waters flowed north. I am not quite certain whether this particular thing happened at the time of the glacier or just as it was passing out of existence but about that period of time.

Q. According to geological history then, Professor Bass, was Lake Traverse and Big Stone at one time one continuous stream, if I may call it that?

A. As I understand.

Q. Outletting where?

A. Outletting through the Minnesota river to the south.

1205 Q. The waters of Big Stone lake then continued and always have continued to go to the south?

A. Yes, sir.

Q. Through the Minnesota river, finally reaching, of course, the Gulf of Mexico through the Mississippi?

A. Yes, sir.

Q. While the waters of Lake Traverse, after the formation of this delta of the Little Minnesota river, flowed to the north, forming part of the Red river of the North and finally finding its outlet into Hudson Bay?

A. Yes, sir.

Q. What distance is there across this delta between Big Stone lake and Lake Traverse?

A. Approximately four miles?

Q. What is that isthmus or delta across there called?

A. Continental Divide.

Q. Is there a town there?

A. Browns Valley.

Q. And this is the Little Minnesota river of which you speak that comes down from near Sisseton, South Dakota?

A. Yes, sir.

Q. And flows on into Big Stone lake?

A. Yes, sir.

Q. What difference in elevation is there between Big Stone lake and Lake Traverse?

A. It is approximately eight feet, Lake Traverse being approximately eight feet higher than Big Stone.

Q. How high is this isthmus or delta at Browns Valley above Lake Traverse?

A. I would judge from having seen it that it would probably — 6 to 10 feet above mean water level in Lake Traverse.

Q. Did you make an examination to determine whether the waters of the Little Minnesota overflowed into the Lake Traverse?

A. I made an examination of the ground at that time, having heard a report that they had done so at times, and found along the bottom of the hill at the west shore of Lake Traverse extending southerly to the Minnesota river, a rather deep channel, which
1206 might or might not have at times from appearances taken some water from the Little Minnesota river.

Q. Into Lake Traverse?

A. Into Lake Traverse.

Q. Did you make an examination over on the eastern side of this isthmus at Browns Valley.

A. Yes, sir.

Q. What did you find there?

A. There was a depression in the ground which had the appearance of having been at some previous time a water channel.

Q. That would indicate that the water flowed which way on that side?

A. That would indicate that if that had been a channel, there had been a water channel through there, the water would have flowed south.

Q. From Lake Traverse into Big Stone?

A. Yes, sir, from Lake Traverse; whether that is a prehistoric channel or comes within historical times, I don't know.

Q. Did you make some examination and investigation to determine whether the quantity of water coming into Lake Traverse from the Little Minnesota and the quantity on the other hand going from Lake Traverse out into Big Stone lake was of substantial importance as concerned the questions in this case?

A. I think they are of very little importance, either one of them.

Q. Did this glacial lake of which you speak have any other outlet to the south except this canyon of Lake Traverse?

A. In the present drainage area of Lake Traverse on the west there is another canyon in Roberts county, South Dakota, another canyon

— as Cottonwood slough which is described as having been a glacial outlet in the same way the canyon of the Lake Traverse was.

Q. I might ask you about the depth and width of Cottonwood slough at this time?

A. I should say that it is approximately a mile in width and from 40 to 100 feet in depth, below the surrounding ground.

(Defendant's Exhibits 22 and 23 are marked.)

Q. When you saw it in May what was the condition as to water in it?

A. In some parts of it, I can't say just what parts they
1207 were, there was considerable water but in general it is—the bottom of it is a swamp and running north and south through this Cottonwood slough there is a stream. The drainage from it divides in Victor township, Roberts county, South Dakota, and part of it goes south into Lake Traverse through Jim Creek and the rest of it goes east into the northerly part of Lake Traverse.

Mr. Palmer: If I have not formerly offered in evidence Defendant's Exhibit 6 I wish to do so at this time.

Q. Will you kindly describe Lake Traverse in a general way, Professor Bass, taking first the southerly part of it, below the confluence of the Mustinka river?

A. The southern part of Lake Traverse below the outlet of the Mustinka river is a long, narrow, permanent body of water with well defined shores, more abrupt on the easterly than on the westerly side, extending from the outlet of the Mustinka northwesterly corner of Walls township in Traverse county southwesterly to a point about, substantially about the village of Browns Valley.

Q. I want to ask you whether that part of Lake Traverse is a true, permanent lake?

A. I so regard it.

Q. Would you describe it as being in any way a swampy area?

A. No, sir.

Q. How is the water as to whether it is clear?

A. It is fairly clear water as I saw it.

Q. Deep?

A. I saw water there at the time I visited somewhere around 6 feet deep on the eastern shore. The United States Army Engineers' map shows the depth all over the lake. It is quite deep in the south part where they have the steamboat lines. This map shows the soundings.

Q. Have you this?

A. I have a copy.

(Defendant's Exhibit 24 is marked.)

Q. What is Defendant's Exhibit 24?

A. This is a map of the survey of Lake Traverse made by the corps of the United States Army Engineers, part of it in 1897 and part of it in 1910.

Mr. Palmer: We offer in evidence Defendant's Exhibit 24.

1208 A. This map does not appear to show the soundings in the southerly part of the lake, south of the outlet of the Mustinka, Professor Bass?

A. No, sir, it does not.

Q. You say you saw steamboats operating on that part of the lake?

A. Yes, sir, in the southern part.

Q. Is there some commerce?

A. Yes, sir, there is.

Q. And elevators?

A. Yes, sir.

Q. How many elevators did you see on the shores?

A. I didn't count them, several of them.

Q. Wheat barges operating?

A. Yes, sir.

(Defendant's Exhibits 25, 26 and 27 marked.)

Q. And this entire body of Lake Traverse, taking in the part that you have already spoken of and the part northerly is the lake described in a- referred to in this printed document #1391 of the sixty-first Congress, third session, marked Defendant's Exhibit 25, and Document #439 of the sixty-fourth Congress, first session, marked Defendant's Exhibit 26, and Document #199 of the sixty-fifth Congress, first session, Defendant's Exhibit 27?

A. Yes, sir.

Mr. Palmer: We offer in evidence Defendant's Exhibits 25, 26 and 27.

Mr. Boutelle: These are severally objected to as immaterial to any issue in this case.

Mr. Palmer:

Q. Will you describe more in detail the shores of this southerly portion of Lake Traverse? By which I mean, south of the outlet of the Mustinka river.

A. The easterly shores with the exception of a small part near the outlet of the Mustinka river is quite sharpley defined, there being many boulders along the edge and the water dropping to a depth of several feet immediately, generally speaking.

Q. How high are the banks on the easterly side?

A. They rise immediately from the lake to a heighth of 3 to 8 or 10 feet.

1209 Q. And then is there some level dry land before the high banks are reached?

A. Yes, there is a shelf of a few hundred feet in width and then the land rises probably 100 feet or so. The westerly shore of the lake is flatter than on the easterly and for a considerable distance along this westerly shore there are marshy areas.

Q. In other words the shelf is not so well defined as on the eastern shore?

A. No, sir.

Q. But in some portions is the shelf quite well defined and well above the water's edge on the western shore?

A. If you get back from the lake several hundred feet you reach land which is never flooded by the lake and it gradually rises on the westerly side until the foot of the abrupt ascent is reached similar to that on the eastern side.

Q. How high do the final banks ascend on the western side?

A. To approximately the same heighth as on the eastern side, I should say, possibly a little higher but about the same as far as I can judge.

Q. Is this shelf of land that you speak of on the easterly side sufficiently high above the water's edge so that that is not overflowed?

A. Yes, sir.

Q. And that is in cultivated farms, is it?

A. Yes, sir.

Q. And how about timber, natural timber, if there is any on either shore?

A. There is some natural timber along the eastern shore on this shelf we are speaking of, very little on the western. I don't know that there is any on the western side, I don't think there is any.

Q. These lands on the western side that correspond to the shelf that you speak of on the eastern side, what part of those are subject to overflow so far as you could observe there, Professor Bass?

A. From my observation I should judge that there were areas varying in width from a few hundred feet to possibly quarter of a mile subject to overflow by the rise of this lake above the level at which it was at the time I saw it.

Q. And are those lands on the westerly side along this shelf in cultivated farms?

A. I should judge not, my recollection is that they were not at the time I saw them.

1210 Q. That is, those that were subject to overflow?

A. Yes, sir.

Q. Where was this overflow land on the western side, was it substantially as is shown in the yellow shaded area on this map, Complainant's Exhibit 1?

A. That portion of the map, Complainant's Exhibit 1, colored yellow, corresponds to the low marshy bottom on this map, Defendant's Exhibit #24, made by the United States Army Engineers.

Q. This lower part of the lake which you have described, that has several islands in it, as shown on this map, Exhibit 24?

A. Yes, sir.

Q. Are those islands considerable in extent?

A. Yes, sir.

Q. What are they, what is the nature of them, are they rocky or swampy?

A. Some swamp on them but there is considerable timber on them. The elevations are given on the map.

Q. Are they rocky islands or swampy islands, as you observed them?

A. As I observed them there was considerable rock around the shores.

Q. Is this Lake Traverse, as you observed it, used as a summer resort?

A. Yes, sir.

Q. Cottages?

A. Cottages along the eastern shore.

Q. Boats, fishing boats, pleasure boats?

A. Yes, sir, I saw a number of them.

Q. I will ask you to tell us something about the lake where the Mustinka river comes into it?

A. The lower section of the lake ends at the point where the Mustinka river comes in except for a channel which connects it with the upper section, known as Mud Lake. The Mustinka river has apparently filled up a delta at this point which explains the separation of the two parts of Lake Traverse. Above the point where the Mustinka river comes in the shores of the lake are low and marshy on both sides.

Q. You speak of a channel connecting the two parts of the lake and cutting through ths delta built up by the Mustinka; which side of the lake is that on, that channel?

A. Western side.

1211 Q. Over on the western side, and is that channel crossed by roadways?

A. Yes, sir.

Q. And bridge?

A. Yes, sir.

Q. Is there a grade, a roadway, extending clear across this delta over to the Dakota side, from the Minnesota side over to the Dakota side?

A. Yes, sir.

Q. A traveled road?

A. Yes, sir.

Q. What is that called?

A. Called the, I think it is called the Reservation bridge, Reservation road.

Q. And sometimes also called the Interstate crossing?

A. Interstate crossing, yes sir. I think I have heard it called that.

Q. Now, into which part of Lake Traverse does the Mustinka river outlet as the lake is divided by this crossing and bridge?

A. I should say that is outletted into the southerly portion of Lake Traverse.

Q. That is, into what you have described here as the true, permanent lake?

A. Yes, sir.

Q. Describe this lake in a general way passing on northerly from the outlet of the Mustinka.

A. The channel connecting the southerly portion of the lake with the northerly portion is approximately a mile in length. Mud lake then extends northerly in an irregular fashion, finding its main

outlet in the Bois de Sioux river, which might be said to commence at a point about 3 miles south of White Rock. It also extends in a westerly arm in a northerly direction through an area known as Clubhouse lake, various arms of which extend up to the road crossing the valley in an easterly and westerly direction at White Rock.

Q. This channel which you have described between the two points of the lake is about a mile long, about how wide is it?

A. It is shown on the map about 100 feet wide. I crossed that channel and I should judge it had a width at that time approximately 100 feet.

Q. Is that the channel referred to in this Congressional Document #1391, Exhibit 25?

A. Yes, sir, it is the same one.

1212 Q. What is the character of this Mud Lake and the land surrounding it?

A. Its shores on both sides are generally low and marshy with the exception of the northerly part of it on the eastern shore which is more or less abrupt.

Q. Westerly shore?

A. The westerly shore is marshy all along practically all the way up to the White Rock road.

Q. Now, Clubhouse lake, just describe that?

A. That is a shallow lake which is shown on the map here as having an area of perhaps two square miles with the water surface at elevation 974.76, which elevation by the way is 1.3 above the datum which is used in the rest of the computations.

Q. Did you examine the conditions at this point of separation of Mud lake and Clubhouse lake?

A. I didn't examine those in very much detail in there; there is a channel connecting these two lakes.

Q. I mean as to what caused that separation of the two parts of the lake there.

A. I should judge that the separation there was caused by this stream coming down from the west.

Q. From the Cottonwood slough?

A. Yes, from the Cottonwood slough, pushing out a delta in the same way that the Mustinka has pushed out a delta further south.

Q. Now, these lands that you speak of on the eastern side as quite narrow and on the western side as somewhat wider, is that also a shelf formation similar to what you described as having found in the southern part of the lake?

A. Not so distinct in the northerly part of the lake; in the vicinity of the outlet of the Mustinka on the eastern shore the land rises gradually. On this southerly side of the Mustinka river the bluffs go up quite abruptly and *and* turn around into Eighteen Mile creek, and then the ground rises quite rapidly, possibly 100 feet or possibly 60 or 80 feet in height along the northerly part of Mud lake on the eastern shore and that height continues to White Rock and commences to flatten out again.

Q. On the west side?

A. On the western side the heights of land gradually
1213 fall in White Rock township shading down into prairie region further north 8 or 10 miles.

Q. But do you on the westerly side of this Mud lake and Clubhouse lake after this swampy area that you speak of next to the water's edge find the same rise in the banks, final banks, that you do further south?

A. Practically, yes, sir, high banks some half mile or so back from the lake.

Q. And how high would you say?

A. Possibly 100 feet in height.

Q. Now, continuing northerly from Clubhouse lake and this point where you say the outlet from the lake forms the Bois de Sioux river, from there on up to White Rock, what is the nature of the land in there?

A. Along the Bois de Sioux river?

Q. Yes, along the Bois de Sioux and along Clubhouse lake?

A. Along the Bois de Sioux there is a marsh about a half a mile in width all the way up to White Rock and between it and Clubhouse lake there is an area that is designated as hay marsh on the government map, separating the Bois de Sioux from Clubhouse lake and Clubhouse lake is shown as about a mile and a half in width, lined with marsh lands on the westerly shore and with one indentation extending in Section 8 west of White Rock about three-quarters of a mile, cultivated hay harsh.

Mr. Boutelle:

Q. Are you reading from the map?

A. I am reading from the map.

Mr. Palmer:

Q. Well, i want to know if those are the conditions there as you observed them.

A. I can't say about that cultivated hay marsh but the general swampy conditions along the shores of this lake are as I observed them.

Q. Those swampy conditions extend up how far to the north, to what?

A. They extend north beyond the limits of this map, designated as Exhibit 24, across the White Rock road to the north and are shown on this Exhibit 6 by dotted lines which extend from the White Rock road north and join the Bois de Sioux—these are really the flood channels of the Bois de Sioux along which at places there are marshy areas.

Q. That is, they seem to converge in the Bois de Sioux at what point, about how many miles north of White Rock?

A. The last one gets in about 5 miles above White Rock.

1214 Q. I want you to speak particularly of the upper Lake Traverse, this Mud lake and Clubhouse lake and the outlet into the Bois de Sioux river on the eastern side up to White Rock road, Professor Bass, what are the conditions there?

A. The Bois de Sioux river extends northward from Mud lake to a point just south of the village of White Rock where it turns easterly, runs past the village of White Rock on the east and goes under the White Rock road and then extends in a general northerly direction through the Bois de Sioux past Fairmount.

Q. Now, as to any swampy conditions that you observed south of this White rock road.

A. Well, the land south of that road in Sections 8 and 9 was generally swampy as I saw it.

Q. Where is this White Rock road you refer to?

A. It is a road extending easterly and westerly across this valley, passing the northerly limits of the village of White Rock on the section line between Sections 3 and 10 of White Rock township, 4, 9, 5, and 8.

Q. That would be——

A. Townshhip 128, Range 47.

Q. I think that is White Rock township; and what at that point controls the northerly reaches of the waters of Lake Traverse, Professor Bass?

Mr. Boutelle: I presume at the present time.

A. At ordinary stages of water the outlets through this road control the amount of water going north through the Bois de Sioux and its flood channels.

Mr. Palmer:

Q. Have you a map showing in detail this Bois de Sioux valley, the contour lines?

A. Yes, sir.

Q. And in fact, the whole lake area from a point some 3 miles south of White Rock northerly to the village of Fairmount?

A. Yes.

(Defendant's Exhibit 28 is marked.)

Q. What is Defendant's Exhibit 28?

A. It is a map of the outlet area of Lake Traverse to Fairmount, North Dakota.

Q. Showing what?

A. Showing the territory in the valley adjacent to the upper portion of Lake Traverse and the Bois de Sioux river. The
1215 village of White Rock is shown the position of the streets being shown there, one foot contours over the whole map, the various flood channels of the Bois de Sioux, the limits of the marshes are shown as indicated in the United States Geological Survey quadrangle, the White Rock road with its various openings is shown, the Milwaukee railroad crossing the area diagonally from southeast to northwest with its various openings is shown, the village of Fairmount is shown.

Q. And what is this map we see on the right-hand side?

A. There is shown on the right hand side of the map a plat of the village of White Rock, South Dakota, showing the buildings with their correct locations and one foot contours over the surface of the ground.

Q. Those contours are made from an actual survey?

A. These contours are made from an actual survey. There were a large number of elevations taken over the lower part of this flooded territory and from these contours in the lower part were put on the map. The upper contours were taken off of the United States Geological survey quadrangles.

Q. To what extent is this area shown here as the flood plane of the Bois de Sioux comparable with the bed of the lake itself or area of Lake Traverse itself?

A. It appea-s to me as the area in which the lake gradually merges into a river.

Mr. Boutelle: Merges into a river where?

A. At a point about 5 miles north of the village of White Rock.

Mr. Palmer:

Q. Would you say that there is no distinct outlet of Lake Traverse in the form of a definite stream of water until a point is reached some 5 miles north of White Rock?

A. No, I wouldn't want to say that because at medium stages of water the stream is fairly well defined. Its channel is a shallow depression in that—very shallow depression in some places in its course as it extends north from White Rock. In very dry seasons when there is no water running out of Lake Traverse, which I judge to be the case, the stream bed is probably difficult to trace. At very high stages it overflows its banks and then the channel would be difficult to trace again.

Q. And as to whether there are, in times of high water, ordinarily speaking, is there more than one outlet of the waters of the lake to the north?

A. At times of high water there are through this road at White Rock eight distinct outlets to the north as shown on this map, Exhibit 28.

1216 Q. And where do these converge or come together, the Bois de Sioux stream?

A. The channels leading from these outlets converge in the channel of the Bois de Sioux river at a point about 5 miles north of White Rock.

Q. From there northward describe the conditions up to, we will say, a point marked by this bridge on the Great Northern railway east of Fairmount.

A. The channel is a little better defined from this point 5 miles northward, north of White Rock up to Fairmount, at which place the banks are quite well defined at ordinary stages of water.

Q. What is the condition along the flood plane?

A. The flood plane is much narrower from the point 5 miles north of White Rock than it is to the south.

Q. And what is the flood plane, how does that compare with the part of the flood plane south from this point 5 miles north of White Rock as to the general nature of it?

A. This flood plane continues but it is narrower than that part—do you mean in regard to the character of the ground?

Q. Yes, that is what I want.

A. I don't know that I can say it differs very much from the south of that point, except that there are some places in this part south of this point 5 miles north of White Rock in which there are permanent marshy places and these are marked on the map, Defendant's Exhibit 28.

Q. Now, continuing on up to the mouth of the Rabbit river, did you make an examination of that flood plane?

A. I crossed the river at—just north of Fairmount and saw the river again at the mouth of the Rabbit and I noticed that north of Fairmount the banks are more distinct and are higher than they are to the south.

Q. The banks of the Bois de Sioux?

A. The banks of the Bois de Sioux.

(At this time recess is taken until 1.30 p. m., October 1, 1917.)

1217. October 1, 1917, 1.30 p. m. Hearing resumed pursuant to adjournment with all parties present.

FREDERICK H. BASS.

Direct examination continued by Mr. Palmer:

Q. I think, Professor Bass, you were describing this flood plain of the Bois de Sioux river from a point about five miles north of White Rock, where you saw these flood channels converge into the Bois des Sioux river, and from there on north to the Rabbit river. I wish you would describe that land more in detail.

A. This flood plain, extending from the various outlets of Lake Traverse along the White Rock road before described is generally very flat. Its highest elevation is about seven to eight feet above its lowest elevation across this width of approximately two and a half miles.

Q. At White Rock?

A. At White Rock, and for a distance of four or five miles north. Then the flood plain narrows perceptibly until it is approximately a half mile wide at this point five miles north of White Rock, and it continues—the flood plain continues up to Fairmount about that width of approximately half a mile. Just before reaching the railroad crossing on the south line of Section 22, of Fairmount township, the flood plain widens somewhat, especially on the western side. The slope is more gradual——

Mr. Boutelle: Prof. Bass, now I don't understand at the present time you are testifying to matters of your own knowledge, but are interpreting the map of the survey made by Mr. Nelson?

A. It is partly both. You see I have been over this area. I have driven over this area, but Mr. Nelson, of course, has put down these things in detail which I have observed in a general way. That is the situation and I have seen over this map with him before, of course. I am just describing my recollection of the area, which is of course sharpened with the map in front of me, which would be the case if I had made the map myself, I suppose.

North of the Soo Line and Great Northern railroads the flood plain perceptibly narrows and the banks of the river become much better defined and are somewhat higher.

1218 By Mr. Palmer:

Q. And does this flood plain continue clear to the confluence of the Rabbit river?

A. I am unable to say just where this flood plain terminates. I haven't examined the conditions north of the Great Northern railroad in any very great detail.

Q. In this flood plain, as you have described it along the Bois des Sioux, what if any evidence did you find as to its's overflow?

A. I remember noticing the high water mark on trees along in sections—I think in sections 28 and 33.

Q. In Fairmount township?

A. In Fairmount township, and that is about all that I noticed. I noticed farther south in the central part of the flood plain about half-way between Fairmount and White Rock marks on the trees too, and Mr. Nelson gathered those—made some notes. I asked him to look that up more carefully. He has information in more detail than I have in regard to that.

Q. Now you have spoken of this area containing Lake Traverse and the two parts of it to the north—Mud lake and Club House Lake, and extending on northerly to White Rock at least, and the flood plain of the Bois des Sioux beyond that as a canyon. I will ask you how far northerly does this canyon effect continue?

A. It begins to disappear on the west a little to the south of White Rock. There is a marked interruption at the point on the east where the Mustinka river comes in and the hills north of the Mustinka, bordering on this flood plain on the east, are considerably lower than those south of the Mustinka. The southerly part of the lake is distinctly bordered by these high hills.

Q. Now I think you have stated that the northerly reaches of the lake are controlled by this White Rock road. I will ask you if you have a profile of that White Rock road?

A. Yes sir.

Q. What is Exhibit 29?

A. It is a sheet containing the profile of the top of the road along the north line of Sections 8, 9, and 10, Township 128, Range 47.

It also contains approximate sections acrossed the Bois des Sious river.

Q. At what place?

1219 A. There are five of these; near the south line of Section 3, Township 128, Range 47, and 400 feet north of the state boundary line.

Q. Of North Dakota?

A. Yes, sir, near the south line of Section 22-129-47; one near the south line of Section 15-129-47; one near the south line of Section 4-129-47.

Q. Does that sheet correctly and accurately show the elevations of the various parts of this White Rock and the openings through the road?

A. I believe that it does.

Q. What is the opening of the Bois des Sioux—the real Bois des Sioux channel—where is that located?

A. That is located immediately east of the Village of White Rock. Shall I give the description?

Q. Yes.

A. On the line between Sections 10 and 3.

Q. That is the main channel of the Bois des Sioux?

A. Yes sir.

Q. And it is through the center of this channel, perhaps we may say here, that the State boundary between North Dakota, South Dakota and the state of Minnesota is established?

A. I so understand.

Q. Will you give me the elevation of the road at that point and the size of the opening there?

A. The elevation of the bridge floor is 975.5. There is a 28 foot steel span at this point, and the elevation on the bottom of the channel at this point if 966.4 feet.

Q. Will you give me in detail the other openings and where they are located?

A. There is an opening about 6,500 feet west of this one just mentioned, consisting of an 18 foot concrete and steel bridge, the top of the guard rail of which is at an elevation of 976.28, and the bottom of the channel of which is 969.2.

Q. Can you state the elevation of the bridge floor?

A. No, I cannot in the absence of notes.

Mr. Boutelle: I suppose that is two and a half feet below the top of the rail?

1220 A. I think that means the rail about eight inches high from the bridge floor.

Q. Railroad bridge?

A. No, a concrete bridge, but there is a little rail on the side, and then a steel railing on top of that.

Q. Give me the next opening?

A. It is about 800 feet west of the last one mentioned and consists of an eighteen foot wooden bridge. The top of the floor has an elevation of 976.12 and the bottom elevation is 973.2.

Q. And the vertical opening?

A. There was a clear opening of 1¼ feet by 17. About 950 feet west of this is a 42 inch corrugated culvert, the elevation of the bottom of which is approcimately 971.2. About 2,000 feet west of the last one named there are two 42 inch corrugated culverts, the elevation of the bottom of which is approximately 970.7. About 400 feet west of the last named there is another 42 inch corrugated culvert the elevation of the bottom of which is approximately 970. About 450 feet west of the last one named there is an 18 foot wooden bridge with a clear opening 1¼ feet vertically by 17 feet horizontally, the bottom of which is at an elevation of approximately 972.6. About 1,100 feet west of the last named there is an 18 foot concrete and steel span bridge, the top of the guard rail of which is 975.5 and the bottom of the channel is 967.2. That describes all the openings.

Q. Now have you made a computation of the aggregate discharging capacity of all of these outlets?

A. I have made an approximate estimate. It is not possible to say that the discharging capacity of any of these openings is any one figure because the discharging capacity varies according to the difference in the heighth of the water above and below these culverts. But under normal conditions, with the water at an elevation of approximately 975. I computed the flow through these various openings at approximately 1,200 cubic feet per second.

Mr. Boutelle: Does that include the Bois des Sioux opening?

A. Yes sir.

By Mr. Palmer:

1221 Q. Now did you take the velocity of the flow into consideration?

A. Yes sir.

Q. And did you ascertain the velocity of the flow?

A. Well, in obtaining the velocity of the flow through these culverts I assumed a difference of elevation of water on the two sides of the road. I haven't these computations with me now but I can submit it.

Mr. Boutelle: What was the maximum distance west from White Rock of the last opening you mentioned on that map?

A. From the west boundary of White Rock it is approximately one and three-fourths miles.

By Mr. Palmer:

Q. Go ahead.

A. I arrived at that discharging capacity by getting the total area of the outlets and assuming a velocity of 2.4 feet per second through the openings.

Q. Where did you get this velocity of 2.4 feet per second through the openings which you assumed?

A. I obtained this by gauging—by current meter measurements.

Q. Of what?

A. The main Bois des Sioux.

Q. When?
A. On May 30, 1917.
Q. You measured that flow by current meter, you say?
A. Yes sir.
Q. And you used that in computing the discharging capacity of these openings in the road?
A. Yes, sir.
Q. What does that give you?
A. Approximately 1,200 cubic feet per second.
Q. That would be then the correct discharging capacity of the entire area of openings through this road?
A. Yes sir.
Q. Now what is the elevation of the road itself, Professor—how many feet above the level of the surrounding land?
A. The elevation of the road irself is at some points even with the surrounding land.
1222 Q. Where is that—where the land is high or low?
A. Where the land is high it is just even with the land on either side. For instance, about three-eighths of a mile west of White Rock it is even with the land on either side.
Q. What is the character of the land?
A. The character of the land there is high. It is higher than the average in that vicinity.
Q. Is it subject to overflow—that land where it is even with the road?
A. No, that has not been overflooded.
Q. At no time, that you could see?
A. I don't think that has been overflooded at any time. That is at an elevation somewhat above 976. There is one other point a mile and a quarter west of White Rock where there is a heighth of land at which point the road is the same elevation. The rest of the way it averages from two to four feet above the adjacent ground, except where there are bodies of water adjoining it, and there it is in some places, I should say six feet above the bottom of the water.
Q. So in sea level datum what is, in a general way, the elevation of this road?
A. With the exception of right at White Rock the elevation of that road is approximately 975.4. That is about the average elevation.
Q. With the exception of what?
A. With the exception of a portion immediately north and west of the village of White Rock.
Q. And there you say the land itself is high—976?
A. Yes, the road at that point goes slightly above 976. The lowest point that we have is 975.1 and the highest point, with the exception of that portion which is just west of White Rock, is 976.
Q. So that waters of the lake, before running over this road, would have to obtain an elevation of how much?
A. 975.2.
Q. And in the spring of 1916, as testified here, they attained an elevation of 977, and of course they would run over the road to a considerable extent?

A. Yes sir.

1223 Q. Did you find evidences of that?

A. Yes sir.

Q. What?

A. I found that the road had been washed to the north.

Q. The grade you mena?

A. The grade of the road had been washed to the north, and there were floating protections on the southerly side of the road.

Q. What do you call those?

A. Booms.

Q. You mean timbers?

A. Yes sir.

Q. Fastened together?

A. Yes sir.

Q. And strung along the side of the road?

A. Yes sir.

Q. To protect the grade?

A. Yes sir.

Q. On both sides?

A. On the south side.

Q. I call you- attention to Defendant's Exhibit 16, and will ask you if that is an approximately correct photograph of the White Rock road as you have described it here, and as you saw it?

A. Yes sir.

Q. And likewise Defendant's Exhibit No. 20?

A. Yes sir.

Q. I show you Defendant's Exhibit No. 30, a photograph—what is that?

A. That is a photograph of the White Rock road referred to looking east from a point on the Southwest quarter of Section 5.

Q. Who took that photograph?

A. I did.

Mr. Palmer: We offer Defendant's Exhibit 30 in evidence.

Q. When was it that you observed these openings in the White Rock road and took the gaugings in the Bois de Sioux?

1224 A. May 30, 1917.

Q. At that time did you observe whether the water was running through the other openings besides this Bois des Sioux river proper east of White Rock?

A. There were some of them through which at that time I think it was not running, but it was running through most of them.

Q. Which way?

A. North.

Q. And following these flood channels, as you have described?

A. Yes sir.

Q. Finally converging into the Bois des Sioux river?

A. Yes sir.

Q. Then, as I understand your testimony, Professor Bass, assuming the velocity of the flow through these openings to be substantially as you found it on May 30, 1917, in the Bois des Sioux

channel east of White Rock, the aggregate discharging capacity of all these openings in this road would be approximately 1,200 cubic second feet?

A. Yes sir.

Q. So that if the water rose above 975.4 there would be no greater discharging capacity for the waters to the north than this 1,200 second feet until the water went over the road?

A. It might have been somewhat larger than that—possibly one or two hundred second feet larger—say from ten to twenty per cent larger, when the water had risen higher on the southern side of the road than I found it and when it had not yet accumulated on the northern side of the road.

Q. Now what effect then, Professor Bass, would this road have upon the natural conditions there?

Mr. Boutelle: Objected to as immaterial to any issue in the case.

A. In a state of nature this road of course did not exist and these various flood channels which now exist north of this road are continuations of the depressions in the surface on the south side of the road, and this road acts as a dike to hold back the waters in the westerly part of Lake Traverse until they reach an elevation of 975.2 or above at which point they overflow the road.

Q. And after overflowing the road what effect would that have on the lands to the north.

1225 A. The water then naturally flows in much greater quantities past the line of this road, because it has a free dischar-ing capacity over the top of the road, the quantity of water going over depending on the height *of* which the water rises on the south-side and the accumulation of water on the north side of the road after some of it has gone over.

Q. Then the result to the lands northerly of the road after the water has gone over is——?

A. In case of a sudden rise of the waters of Lake Traverse this means a sudden flooding of these lands to the north of this road by waters which cross the road, and by tearing it out brings still more water acrossed to the north from elevations lower than 975.2 through the channel which they have eroded in the road.

Q. Will you tell me the discharging capacity of the opening just east of White Rock in the Bois des Sioux channel itself, the main Bois des Sioux channel?

A. Approximately 464 cubic second feet at that velocity which I gave. It would be somewhat exceeded when the water is higher, so the actual carrying capacity of that opening is something over 500 second feet.

Q. Now proceeding north from White Rock, did you find other roads or road grades acrossed the Bois des Sioux valley?

A. I didn't see any myself between White Rock and the steel bridge at the south line of Fairmount, but it has been testified here that there were such road grades.

Q. Didn't you see the one at Blackmere?

A. Oh, yes. I did see one at Blackmere.

Q. The one at Blackmere you observed and it has been testified that there is one substantially on each section line all the way up from White Rock to Fairmount and that in two instances at least there were obstructions clear acrossed the Bois des Sioux channel itself. I want to ask you what would be the effect upon the flood conditions there of these various road grades?

A. Tend to raise the level of the water upstream over such obstruction and cause a flooding of adjacent lands.

Q. You have heard described here the flooded condition of those lands in this Bois des Sioux flood plain in the summer of 1915 and the spring and summer of 1916?

A. Yes sir.

1226 Q. What in your opinion was the effect of these various roads the White Rock road and the other roads upon that condition that was found there?

A. I think they would tend to aggravate it.

Q. Why?

A. The White Rock road by holding back water which would at moderate flood stages find its way more easily through the Bois des Sioux main channels than the flood channels. Those channels would then have, without that road, wider openings and wider channels through which to flow, consequently more water would have escaped before the crest of the flood, thus making the course of the flood less serious. These various roads described acrossed the channel would act somewhat in this same way although not so seriously.

Q. Now I want to ask you something about the fall in this Bois des Sioux channel. Have you a profile of the Bois des Sioux channel?

A. Yes.

Q. What is Defendant's Exhibit 31?

A. That is a sheet showing the profile of the Bois des Sioux river, and it also contains a profile of a part of the cut-off ditch.

Mr. Palmer: We offer in evidence Defendant's Exhibit 31.

Q. Calling your attention particularly to the profile of the Bois des Sioux channel, simply to make it easier as we go along, I wish you would tell me what the fall is from the White Rock railroad bridge for the first nine miles north?

A. It is 2.6 feet in that distance.

Q. Which would be about how many feet to the mile?

A. About a trifle less than three-tenths of a foot to the mile.

Q. And is this fall indicated on the profile?

A. From the point marked Railroad bridge at White Rock to the point marked South line of Section 27-130-47.

Q. And I take it that the space between the distinct red line near the top and the black line below respresents the amount of the fall?

A. Yes, that represents the amount of the fall.

Q. What would be the effect of these various road grades and obinstructions acrossed the channel on the flow where the fall was so slight as it is in this first nine miles?

1227 A. It would be more serious than if the fall was greater.

Q. Why?

A. Because for every foot through which the surface of the water was raised there would be a greater flooding than if the fall was steeper, because the influence of that foot would extend farther back on a flat slope than it would on a steep slope.

Q. And how about the length of time for which the water would remain on the land?

A. Water will remain on land on which there is a flat slope for a longer time than it will on land on which there is a steep slope.

Q. These obstructions—would they tend to make it remain there longer?

A. Well, an obstruction of a given height*h*, any considerable height*h*, as these obstructions were—several of a foot or two, would cause a greater diminution in the hydraulic gradient than if the same obstructions were placed on a steep slope. Therefore the velocity of the flow would be diminished to the greater extent on a flat slope than it would on a steep slope.

Q. Now I believe this first nine miles would bring us to the Southeast corner of Section 28, or about one mile south of Fairmount?

A. It would bring us to the south line of Section 27 which adjoins that point which you mention.

Q. And how far is that south of Fairmount?

A. It is one mile south of the south line of Fairmount.

Q. Now will you state the slope from this point a mile south of Fairmount to the bridge two miles north of Fairmount?

A. There is a slope from this south line of Section 27-130-47 to the south line of Section 15, at which point the high bridge is located of 4.4 feet.

Q. In what distance?

A. A distance of 11,600 feet.

Q. Which is about how many feet to the mile?

A. Which is practically two feet to the mile.

Q. For how far does that fall—substantially that same fall continue, Prof. Bass?

A. At the high bridge the slope again becomes somewhat flatter, extending to a point about six miles north of Rabbit river, and the slope in that distance is about 1.35 feet to the mile.

1228 Q. That is up to the mouth of Rabbit River?

A. And about six miles beyond.

Q. Now from the mouth of the Rabbit River to Wahpeton, did you ascertain what the increase in the fall of the Bois de Sioux river is—about what percentage of the flow above there?

A. Practically the same velocity above and below it.

Q. And from the mouth of the Rabbit river on to Wahpeton is there not an increase in the fall?

A. No, there is a decrease for about six miles. Beyond the Rabbit River there is a decrease in grade and consequently in the velocity of the flow.

Q. Now I want to ask you about the elevations of the water surface in Traverse Lake. Have you made a study and investigation of those?

A. I have made such a research as was possible in regard to the

records of the levels of the water in Lake Traverse and I found in the office of the United States Engineer at St. Paul some records covering parts of years 1907, 1908, 1909, 1910 and 1911.

Q. What is Defendant's Exhibit No. 32?

A. That is a copy of these elevations referred to in my last answer.

Q. A certified copy of the official elevations?

A. Yes sir.

Mr. Palmer: We offer in evidence Exhibit No. 32.

Q. By whom are these elevations in Exhibit No. 32 taken, did you say?

A. These are taken from records of G. C. Lindquist.

Q. Connected with what department of the government.

A. United States Engineer's office at St. Paul.

Q. I believe you have spoken of and there have been introduced here in evidence a number of U. S. Geological Survey quadrangles?

A. Yes sir.

Q. Is there a difference in the sea level datum as used by the engineer's office and the U. S. Geological Survey?

A. There was at the time these levels were taken, yes sir.

Q. What was that?

A. 1.29 feet. The elevation shown on this Defendant's Exhibit 32 being 1.29 feet above the datum used by U. S. Geological Survey which we have used in our maps.

1229 Q. How does that difference come that?

A. That comes about through there having been an adjustment of bench marks in that region since the date of these surveys. By adjustment I mean a more precise determination of the bench marks. I have here a detailed description from the note books in the office of the United States Engineer and the books of the United States Engineer's office to show how this difference was traced.

Q. I hardly think it will be necessary to put that detailed statement in evidence. You know there was this adjustment, and it is necessary to deduct 1.29 from the elevations of the United States Engineer's office to make them identical with the United States Geological Survey elevation?

A. Yes sir.

Q. And have you made a statement showing these corrections by a deduction of this 1.29 from the elevations shown on this Defendant's Exhibit 32?

A. Yes sir.

Q. What is Defendant's Exhibit 32-A?

A. That is a copy of this Defendant's Exhibit 32 with the addition of these lake levels reduced to the present sea level datum as used by the United States Geological Survey.

Q. The second colum shows the corrected elevations?

A. Yes sir.

Q. Then Professor Bass what is the average mean elevation of Lake Traverse as shown by these surveys?

A. I estimate it at 973.3 above sea level.

Q. Is that correct?
A. I believe it is, as nearly as I can determine.
Q. And the low water elevation—give us that?
A. The lowest elevation given here is 971.68 on June 8, 1911.
Q. And the highest?
A. The highest given is 976, May 1, 1907.
Q. The high water elevation as recorded by the local observers, did you ascertain that?

Mr. Boutelle: Objected to as hearsay.

A. As recorded by local observers and determined by Mr. Nelson leveling from the U. S. Geological Survey marks the maximum high water elevation was 976.61.
1230 Q. What date?
A. That was in April, 1916—and in the spring of 1881, the same elevation.
Q. Now did you ascertain the area of the lake in square miles at extreme low water mark—971.68?
A. I determined the area of Lake Traverse—the water area of Lake Traverse from the original of this map, Defendant's Exhibit 24, by planimetering at elevations of——
Q. Planimetering what?
A. I determined the areas of water surface by planimetering at elevation of 971.68.
Q. Will you state the area at the different elevations?
A. The water area of the Lake at 971.68 was 20.6 square miles; at 973.3, the average elevation, the area of the lake is 27.4 square miles; at 976.6, the area of the lake is 38 square miles.
Q. Now that takes in the total water surface areas up to what point?
A. Up to the White Rock road.
Q. I wish you would give me the elevation of the ground just west of the Village of White Rock itself—that would be in the northeast quarter of Section 9, Township of White Rock?
A. The ground just west of White Rock is at its lowest point 975.5.
Q. So that when the water attained a heighth of 975.5 it would pass through this ridge of land that you have described as being just west of White Rock?
A. Yes.
Q. From there where would it go?
A. Easterly through the village of White Rock into the main channel of the Bois de Sioux.
Q. And that is what brought about this flooding of the village itself in times of high water, as have been described here?
A. Yes sir.
Q. But at the extreme high water,—976.6, Professor Bass, how much of the Village of White Rock would be flooded?
A. The evidence given here shows that the water at White Rock on the easterly side of the ridge just mentioned never attained such

an elevation as 976. It attained an elevation of between
1231 973 and 974.

Q. And the portion of White Rock which would be flooded by this water going across would lie between the contour lines 973 and 974 as shown on this detailed map of White Rock?

A. Yes sir.

Q. How much of an area is that in the village?

A. Approximately a third of the area built on would be affected by the water.

Q. I neglected to ask you as we went along about this grade of the Chicago, Milwaukee and St. Paul railroad across this flood plain of the Bois de Sioux valley. The map Exhibit 28, shows the openings in the railroad grade acrossed the flood plain there?

A. Yes sir.

Q. And as shown here on the map that railroad grade crosses the flood plain from southeast to northwest?

A. Yes sir.

Q. And did you make a computation of the openings through the railroad grade?

A. The openings have an aggregate area of 763 square feet.

Q. Is that in addition to the main channel of the Bois des Sioux?

A. Yes sir.

Q. At White Rock?

A. Yes sir.

Q. That would be then substantially two and a half times a- great as——

A. As the openings in the White Rock road. These are the openings of the various flood channels as they cross this flooded area.

Q. Did you observe whether the track had been recently raised acrossed the flood plain there?

A. I couldn't tell from observation whether it had been recently raised or not.

Q. Now what effect does this railway grade have on the flood conditions, if any, Prof. Bass, in the Bois des Sioux valley there?

A. Well it is my opinion that it too holds back the flood water to some extent, decreasing the free area in the flood channels.

1232 Q. And if in 1915 and 1916 it was in fact lower and with fewer openings than it has now it would aggravate conditions there that much more?

A. The fact that there were fewer openings would have that tendency.

Q. What are some of the higher elevations of the ground on this flood plain from White Rock to Fairmount?

A. In the first four miles north of White Rock in this flood plain there are three distinct elevations of land which rise to an elevation of 976 above the sea level and two which rise to an elevation of 977 above the sea level.

Q. Did you observe those lands to see whether they had been subject to overflow or flooded?

A. I did one of these particularly?

Q. Which one is that?

A. That is one which rises to 977. That is where that Sauter farm is in 20—on the line of Sections 29 and 30 of Fairmount township.

Q. What would you say as to whether those lands had ever been subject to overflow?

A. I think there is no question but that they were not because with their elevation of 977 and the water elevation of 977 back in Lake Traverse it couldn't have reached 977 at this point farther down the stream, and at the point stated it never had. The farm was in good condition at that time and crops were growing on it.

Q. That was in May, 1917?

A. Yes sir.

Q. Did you take a photograph of that farm?

A. Yes sir, two.

Q. I show you Defendant's Exhibits 33 and 34—what are these?

A. These are photographs taken by myself of the section line between Sections 20 and 29, Fairmount township.

Q. That is what has been spoken of here as the Sauter farm?

A. Yes sir.

Q. Is the position from which they were taken and what they represent indicated on the back of these photographs?

A. Yes sir.

1233 Q. What is Defendant's Exhibit 35?

A. That is a photograph of the crossing of the Chicago, Milwaukee and St. Paul Railway south of White Rock over the Bois des Sioux river.

Q. What is Defendant's Exhibit 36?

A. That is a photograph of a school house in White Rock village.

Q. What is Defendant's Exhibit 37?

A. That is the first National Bank of White Rock.

Q. What is Exhibit 38?

A. That is Oscarson's store in White Rock—one of the general stores there.

Q. What is Exhibit 39?

A. That is a photograph of the main street in White Rock?

Q. What is Exhibit 40?

A. That is a photograph of the flood of the Bois de Sioux river from a point on the east bank about an eighth of a mile north of the bridge in the White Rock road, looking towards the southwest. The village of White Rock is in the background.

Q. Defendant's Exhibit 41?

A. That is a view of the White Rock road looking towards the Northwest about at a point near the Northeast corner of Section 8.

Q. Who took these photographs?

A. I did.

Q. When?

A. On May 30, 1917.

Mr. Palmer: We offer in evidence at this time Exhibit No. 32-A in connection with exhibit 32, and also offer in evidence Photographs Exhibits 33 to 41 inclusive.

Q. With the elevation of the lake at 977, as testified to by the witness Ralph, in 1916, in your opinion and from your study of the situation there the lands at what heighth in the Bois des Sioux valley would be flooded?

A. This elevation of 977, as I recollect, was given in the main part of the Lake and elevation of 977 would scarcely be reached at the White Rock road. That is there would be some lesser elevation at the White Rock road, possibly 976 and a few tenths, so that the land immediately north of the White Rock road might be submerged by an elevation of 976 and over, and from there on north
1234 the water would have some slope which it is very difficult to determine except by measurements, and not having made any measurements of it at flood time I don't pretend to say what it might have been. I don't believe I obtained any evidence to indicate what the elevation was at Fairmount, but it would gradually—naturally the elevation of the surface of the water would grow less as it extended north because the water was flowing in that direction, but just how much that fall was I can't say.

Q. Did you make a cross-section of the Bois des Sioux channel at the Great Northern Railway bridge just north of Fairmount?

A. Yes, sir.

Q. Did you make a computation of the discharging capacity of the channel at that point?

A. I made a computation of the discharging capacity at that bridge, assuming an elevation of the surface of the water of 969, and a velocity based on a calculation which was in turn based on the slope of the bottom of the channel at that point. We took the actual area of the opening of the water level at 969 and then multiplied that by the velocity which would be obtained from a slope parallel to the slope of the river bottom at that point. The velocity was about 2.7 feet per second, and it gives a discharging capacity of approximately 2,000 second feet.

Q. Is there some addition to the drainage area into the Bois de Sioux valley directly, between White Rock and Fairmount?

A. Yes, sir.

Q. How many square miles, Prof. Bass?

A. 158 square miles, 113 of which is in South Dakota, and North Dakota and 45 square miles of which is in Minnesota.

Q. Now what is the drainage area into Lake Traverse itself on the Dakota side?

A. 360 square miles.

Q. And does that exclude this 158 square miles that goes directly into the Bois des Sioux valley which you have just mentioned?

A. Yes, sir.

Q. Now will you give me the drainage area tributary to Lake Traverse in Minnesota, the total?

A. 924 square miles.

1235 Q. Give me the amount in Dakota separately?

A. I have given you that separately. It is 360 square miles.

Q. That excludes the 158 square miles?

A. Yes, but it includes all of the area in Minnesota draining directly into Lake Traverse, that from the Mustinka and that outside of the Mustinka. I might say of this 924 square miles, 131 square miles drains directly into the lake and 793 square miles comes in through the Mustinka river.

Q. That gives a total drainage area into Lake Traverse and the Bois des Sioux valley of how many square miles?

A. 1,442 square miles at Fairmount.

Q. Now that excludes the Rabbit River drainage area, does it?

A. Yes, sir.

Q. Now will you give me in square miles the total Mustinka drainage area?

A. The total Mustinka drainage area, including the upper Mustinka, Five Mile creek, Twelve Mile creek, and the main Mustinka below the confluence of these and also Eighteen Mile creek, is 793 square miles, 67 square miles coming from 18 mile creek drainage area, 38 square miles coming from the main Mustinka below the confluence of its tributaries, the Five Mile and Twelve Mile creeks and the Upper Mustinka; from the drainage area of Twelve Mile creek 364 square miles; from Five Mile creek, 121 square miles; and 203 square miles from the Upper Mustinka drainage area.

Q. Now is this Eighteen Mile creek that you spoke of indicated on this Map, Defendant's Exhibit No. 6?

A. Yes, sir.

Q. Where does that come into the Mustinka?

A. That comes into the Mustinka just above the lower end of the Mustinka ditch. The Mustinka ditch ends here in Section 27, and this comes in on the line between Section 26 and 23.

Q. In West Lake Valley township?

A. Yes, sir.

Q. In your opinion is this Eighteen Mile creek drainage area material, Prof. Bass?

A. I think not.

1236 Q. Then will you tell me, excluding this Eighteen Mile creek drainage area, what percentage of the total drainage area into Lake Traverse and the Bois des Sioux is comprised in the Mustinka river drainage area?

A. Just about fifty per cent.

Q. Now directing your attention particularly to this fifty per cent of the total drainage area into Lake Traverse and the Bois des Sioux river, I wish you would tell me what percentage of that Mustinka drainage area is comprised within the drainage area tributary to what is called the upper Mustinka river, by which I mean the Mustinka river from it's source in Ottertail county to its confluence with Twelve Mile and Five Mile Creeks?

A. Twenty-nine per cent.

Q. Now addressing ourselves particularly to that twenty-nine per cent in this Upper Mustinka watershed, I will ask you if you as-

certained the slope of the channel of the Upper Mustinka river through that area?

A. I determined the slope of the Upper Mustinka from it's source to the point where it turns west in Section 27, Township 128, Range 43, and westerly to the point beginning of the Mustinka ditch just west of Norcross.

Q. What is that slope?

A. That slope is about 2.25 feet per mile.

Q. Did you determine the slope of the land surface through that area?

A. The land surface in that area of the upper part of the Mustinka is somewhat rolling, and its average slope would be considerably greater than that in any other part of the Mustinka drainage area.

Q. About how many feet to the mile?

A. 2.2 feet to the mile. I assumed the side slopes of those valleys as having a maximum slope of thirty feet vertically in a thousand feet horizontally. That is approximate. I made no measurements at all, but that slope is seen on the contours in that region.

Q. But you did make measurements of the slope in the channel?

A. No, those were all obtained from the Geological Survey map, which I assumed to be correct.

1237 Q. I want to ask you while we are upon this part of the drainage area about this Upper Lightning Lake area which is indicated on Plaintiff's Exhibit No. 1 as tributary to the Upper Mustinka river, and will ask you if you ascertained to what the waters in there are tributary?

A. Lightning Lake is tributary to the Rabbit river.

Q. And Ash lake, to the south?

A. It is the source of the Rabbit river.

Q. Did you make a study, in a general way of the land surface in this Upper Mustinka drainage area?

A. Yes, sir, I drove and walked through that area for the greater part of one day, and in that way became fairly well acquainted with it.

Q. Describe it in a general way?

A. As I have stated, it is a gently rolling district with valleys and depressions, having steep side slopes. Many of these slopes lead to depressions having no outlet. Some of them lead to streams having their outlet in the Mustinka river.

Q. From your experience as an engineer and from your study of hydraulics, and run-off and like matters, will you state what effect on the run-off these depressions and small lakes or natural reservoirs have?

A. They serve to detain the precipitation, preventing it from going into the stream until these depressions overflow, if they ever do overflow, thus reducing the total run-off and especially reducing the flood flow.

Q. Now I want to ask you what percentage of this Mustinka drainage area is comprised within the drainage area tributary to Five Mile Creek, Prof. Bass?

A. About sixteen and two-thirds per cent.

Q. Now did you ascertain the flow of the channel of Five Mile creek?

A. Yes, sir.

Q. What is Defendant's Exhibit 42?

A. That is a sheet showing profiles of Twelve Mile creek and Five Mile creek, part of the Mustinka river and the cut-off ditch and State Ditch No. 19, which is the first section of the Mustinka State Ditch.

Q. Now giving our particular attention to this profile of the Five Mile creek, will you tell us the slope of the channel?

A. 2⅔ feet per mile for the upper nine miles, from the south line of Section 12-127-45 to the West line of Section 20-128-45. The next three miles it has a drop of 1¼ feet per mile; that is, up to the south line of Section 8-128-45.

1238 Q. That is, up to the south line of Section 8, about half a mile from the confluence with the Mustinka river?

A. Those last two miles are in the Redpath sloughs.

Q. Now does that bring you practically to the confluence of the Mustinka?

A. It brings us up to within a quarter of a mile of the confluence with the old Mustinka.

Q. What is the slope of the land surface along this Five Mile creek?

A. Approximately five feet to the mile.

Q. Now what percentage of this drainage area tributary to the Mustinka river is comprised within the drainage area of Twelve Mile creek, Prof. Bass?

A. About 54 per cent.

Q. Did you ascertain the slope in the channel of the Twelve Mile creek?

A. Yes sir.

Q. And you say there is a profile of it shown on this map, Defendant's Exhibit 42?

A. Yes. The upper 21,000 feet have a slope of about three feet per mile; the next 26,000 feet have a slope of about 1.6 feet per mile; the next 26,000 feet have a slope of about one foot per mile.

Q. That brings you to what point?

A. To the east line of Section 12-128-46, which is a point at the confluence with the Upper Mustinka.

Q. What is the slope of the ground along the line of this Twelve Mile creek channel?

A. The slope of the ground is about four feet to the mile, between four and five feet per mile.

Q. Now you say this Exhibit 42 contains a profile also of the lower part of the Upper Mustinka river?

A. It does from the west line of Section 22-128-44, near Norcross, down to the confluence with Twelve Mile creek in Section 7-128-45.

Q. And what is the slope in that distance, the slope of the channel?

A. In 79,000 feet it is 2.25 feet per mile.

Q. Does Defendant's Exhibit 42 also show the slope of the old river channel from the confluence of Twelve Mile creek with it on around the bend to the north?

A. Yes sir, and continuing on to the center line of Section 23, in township 128, range 46. The average slope is about 1½ feet per mile.

1239 Q. That is on around the bend—and does that take it on down to the lower end of the new cut-off ditch that has been spoken of here?

A. Yes.

Q. Now let me get that clear. The slope of the old river channel from its confluence with Twelve Mile creek on around the bend and down to the lower end of the present cut-off ditch is 1½ feet per mile?

A. Yes.

Q. Now do I understand that this Exhibit 42 then shows the slope in the rectified channel from the lower end of the present cut-off ditch down to the outlet?

A. Yes sir.

Q. And what is that slope?

A. 1.34 feet per mile.

Q. Now does this Exhibit 42 contain a profile of the present cut-off ditch from its outlet into the old channel easterly to Twelve Mile creek?

A. Yes sir.

Q. And also containes a profile of the old State Ditch No. 19 known as the first section of the Mustinka State Ditch to its beginning in Section 20-128-44?

A. Yes sir.

Q. Now will you give me the slope per mile of the first section of the Mustinka State Ditch, begin-ng at its source in section 20, just westerly of Norcross to the point where it meets Twelve Mile creek?

A. The fall is 4.75 feet per mile.

Q. Now I will ask you about the slope in this new cut-off portion of the ditch from Twelve Mile creek proceeding westerly?

A. For the first 1,800 feet there is a slight negative or backward slope in the bottom of the ditch, and in the first 3,800 feet there is a fall of 2/10 of one foot. In the next 1,000 feet there is a fall of 3/10 of a foot; in the next 1,200 feet there is a fall of 6/10 of a foot; in the next 1,300 feet there is a fall of 1/10 of a foot; and in the next 3,350 feet there is a fall of 2 feet; the next 550 feet there is a fall of 3/10 of one foot; then in the next 7,500 feet there is a fall of 5 8/10 feet, which brings us to the center of Section 23-128-46, just below the confluence of the cut-off with the Old Mustinka channel.

1240 Mr. Boutelle: You didn't give the average?

A. No, I didn't.

Q. Have you got an average slope per mile through that cut-off?

A. 2.1 feet per mile, approximately.

Mr. Palmer: We offer in evidence Defendant's Exhibit 42.

Q. Prof. Bass, did you make cross sections of the Upper Mustinka river, Five Mile and Twelve Mile creek channels and of the ditch channels at points?

A. Parts of them.

Q. What is Defendant's Exhibit 43?

A. These are cross sections of the Mustinka river at various places along the course as described in detail on the sheet itself; also cross sections in the new channel.

Q. Now, professor, I call your particular attention to these cross-sections on the extreme right hand side of this Exhibit 43. State in a general way what those are?

A. Those are cross sections of the Mustinka river. The lower one is at a station 200 feet north of the north line of Section 23-128-46.

Q. And from there on in what directions?

A. The other sections are then farther up stream, continuing on around the bend to the point of confluence and beyond in the old Mustinka river.

Q. And these are cross sections showing the old river along the northerly bend that was cut off by the cut-off ditch as it has been called here?

A. Yes sir.

Q. What are the cross sections next to the left?

A. These are cross sections of the bridge crossings in the old channel of the Mustinka river, the lowest one at the north line of Section 23-128-46, and continuing back upstream to the bridge over the old channel at the east line of Section 12-128-46.

Q. And the next column of cross-sections to the left—what are those?

A. These are cross sections of bridge crossings on the Mustinka river beginning at the Milwaukee railroad bridge crossing on the Northwest quarter of 18-127-46, proceeding back upstream to the wooden bridge in the center line of Section 4-127-46.

Q. The next column to the left is what?

A. The first two are cross sections of the Mustinka river near the southwest corner of Section 28-127-47, below the outlet of the
1241 Mustinka State ditch, then going back up the channel to the cross section in Section 13-127-47; a cross section of the new channel on the Southeast quarter of Section 7-127-46; and a cross section of the old channel on the Southeast quarter of Section 7-127-46.

Q. So that, in general, this Defendant's Exhibit 43 starts at a point in the Mustinka river below the outlet of the Mustinka state ditch and shows cross sections thence upstream clear around the northerly bend to the beginning of the new cut-off of Twelve Mile creek?

A. No, up to and beyond the confluence of the Mustinka in Section 7.

Q. The confluence of the old Mustinka river in Section 7, in the Redpath township?

A. Yes, sir.

Mr. Palmer: We offer Defendant's Exhibit 43 in evidence.

Q. Have you some cross-sections of the channel of Twelve Mile creek?

A. Yes, sir, Five and Twelve Mile creeks both.

Q. What is Defendant's Exhibit 44?

A. This is a sheet showing cross-sections of the cut-off section of the Mustinka ditch and some sections of the State Ditch No 19, known as the first section of the Mustinka ditch, certain cross sections of Five Mile Creek and certain sections at certain bridges on Twelve Mile Creek. The bridges are shown on Twelve Mile creek only.

Q. And these cross-sections are at the points as described on the exhibit itself?

A. Yes, sir.

Mr. Palmer: We offer Defendant's Exhibit 44 in evidence.

Q. Where figures appear upon these maps of these cross sections, I take it, Prof. Bass, that has reference to feet?

A. Yes, sir.

Q. And that is true of each of these maps that have been offered here?

A. Yes, sir.

(Adjournment taken until 10 a. m. October 2, 1917.)

October 2, 1917.

Hearing resumed pursuant to adjournment with all parties present.

Direct examination of FREDERIC H. BASS resumed by Mr. Palmer:

1242 Q. What is Defendant's Exhibit No. 45, Prof. Bass?

A. That is a photograph of a bridge across the Mustinka river in Section 28, near the southwest corner of 28-127-27. This photograph is taken below the excavated portion of the ditch.

Q. Do I understand then that that is a photograph of the original Mustinka river just as it is to-day below the outlet of the Mustinka State ditch?

A. Yes, sir.

Q. How far below the excavated portion of the river channel?

A. Approximately a mile.

Q. When was this photograph taken?

A. May 27, 1917.

Q. By whom?

A. Myself.

Q. What is the width, just in round numbers, of the river at that point?

A. Between 150 and 160 feet.

Q. Did you ascertain the depth of the water at that point?

A. No, sir.

Q. The heighth of the banks—just approximately?

A. The cross-section shows that more accurately.

Q. Did you observe whether there was any current in the river at that point?

A. At the time I was there there was a rather moderate current.

Q. How far is that point from the lake?

A. Approximately two miles.

Q. Did you examine the conditions later on to see whether the water backed up and whether it was dead water at that point in the river?

A. Undoubtedly there is some effect from backwater of the lake at that point. I made no measurements myself to determine.

Q. What is Defendant's Exhibit 46?

A. That is a photograph of the original channel of the Mustinka river near the center of Section 27-127-47, looking east. At this point the river is about 150 feet wide, the northerly bank being about ten feet high and the south bank about 15 feet high. In giving these heighths of the banks it is subject to such corrections as the cross-sections may show.

1243

Q. Was this Exhibit 46 taken below the excavated portion of the river?

A. No, sir.

Q. Where was it taken?

A. It was taken about—I should say six to eight hundred feet above the lower end of the last cut-off of the ditch, which is the lower end of the ditch.

Q. Now then that is a photograph of the original channel of the river?

A. The water was flowing through the river and the cut-off both.

Q. But this then, as I understand it, is the original river in the loop cut off by the excavation?

A. Yes, sir.

Referring to Defendant's Exhibit No. 2 and particularly the portion marked 2-A, do you mean that this photograph Exhibit 46 is a photograph of the original channel of the river there near the center of Section 27?

A. Yes, sir.

Q. Being a part of that loop cut off by the ditch?

A. Yes, sir, the lower part.

Q. What is Defendant's Exhibit 48?

A. That is a photograph taken near the center of Section 27, last referred to, looking north toward the lower end of the ditch. The excavation shown in the background is the last cut-off.

Q. Describe the river at that point, the original river?

A. The original river here is approximately 100 feet wide, the northwest bank being 12 feet high and the southeast bank being six feet high. The depth of the water was seven feet at this time—May 27, 1917.

Q. All of these photographs which I show you were photographs taken by you on or about the 27th of May, 1917?

A. Yes, sir.

Q. What is Defendant's Exhibit 48?

A. That is a photograph of the rectified Mustinka in the southeast quarter of Section 22-127-47, looking west. I have a note on this photograph saying: no excavation of consequence from this point to last cut-off, that is from this point to the cut-off shown in the last Exhibit No. 47.

1244 Q. And that was the condition as you observed it there?

A. Yes, sir.

Q. What is Defendant's Exhibit No. 49?

A. That is a photograph of the Mustinka river east of the Schumacher house in the Southwest quarter of 23-127-47, showing the original river where it cut off. It is at this point 75 feet wide, the west bank 7 to 10 feet high and the east bank 6 to 8 feet high. The purpose is to show the character of the original Mustinka river in Section 23.

Q. What is Defendant's Exhibit 50?

A. That is a photograph of the wagon bridge in the foreground and the railroad bridge in the background acrossed the Mustinka ditch in the Northwest Quarter of Section 18-127-46. The railroad is the Chicago, Milwaukee & St. Paul.

Q. Now as I understand it then, Exhibit 50 is a photograph of the railroad bridge and the wagon bridge northwest of Wheaton that has been referred to here many times in the testimony?

A. Yes, sir.

Q. What is Defendant's Exhibit 51?

A. That is a photograph taken in the bottom of the old river channel, southeast quarter of Section 7-127-46, looking southeast. The width of the channel at this point is 75 feet; the northeast bank is ten feet high and the southwest bank is seven feet high. The channel is well defined. This shows the part of the river cut off by the ditch known as the Heggen cut-off.

Q. What is Defendant's Exhibit 52?

A. This is a photograph of County Ditch No. 23, going into Twelve Mile creek from the east at or near the Southwest corner of Section 29-128-47. This County Ditch No. 23 carries water from Five Mile creek acrossed to Twelve Mile creek. The banks of Twelve Mile creek at this point are approximately eighteen feet high. The depth of the water at the time of taking this photograph in Twelve Mile creek was four feet and the width of the water surface was seventy feet.

Q. What is Defendant's Exhibit 53?

A. No. 53 is a photograph of Twelve Mile creek at the same point referred to in Defendant's Exhibit 52. The bridge has a

1245 span 75 feet acrossed Twelve Mile creek at this point. This photograph gives an excellent idea of the general character of the channel of Twelve Mile creek in this vicinity.

Q. What is Defendant's Exhibit No. 54?

A. It is a photograph looking north along Twelve Mile creek from a point near the Northeast corner of Section 30-128-45.

Q. That would be nearly up to the place where it is now intercepted by the cut-off?

A. One mile south.

Q. What is Defendant's Exhibit 55?

A. Exhibit 55 is a photograph of Twelve Mile creek, looking west, near the Northeast corner of Section 30-128-45. The channel at this point is about 75 feet wide. The banks are ten feet high and the water at the time of taking of this photograph were about five feet in depth.

Q. What is Defendant's Exhibit No. 56?

A. No. 56 is a view of the old Mustinka river at the Neuman farmyard, section 7-128-45.

Q. I want to ask you particularly about that Exhibit 56. Is that a photograph of the old Upper Mustinka river after it has been joined by the Five Mile creek, and just before its confluence with the Twelve Mile creek at the Neuman place in Section 7?

A. Yes, sir.

Q. Now what is Defendant's Exhibit No. 57?

A. Exhibit 57 is a photograph of Twelve Mile creek, taken on the south side of the Neuman farmyard, Lot 11, Section 7-128-45, immediately before it is joined by the channel of the old Mustinka shown in Defendant's Exhibit No. 46. The width of the stream at this point is about eighty feet. The banks are strongly defined. The north bank is ten feet above the water level and the south bank six feet above the water level *and the south bank six feet above the water level* at this time—May 28, 1917.

Q. Now do these two photographs, Exhibits 56 and 57, give a good idea of the character of those two streams just before their confluence—that is, the old Mustinka river and the Twelve Mile creek?

A. Yes, sir, they are photographs of the two places taken on the same day, at points just across the peninsula from each other.

1246 At that time was there any water in the old Mustinka river?

A. Just a little.

Q. How much?

A. The stream was at this point about eighty feet in width.

Q. How deep?

A. I didn't measure the depth at that time at that point.

Q. And whether it was a strong, heavy stream of water?

A. There was a perceptible current in the stream. There was a considerable amount of *of* water going through at that point. I made no measurements of the exact quantity at that time.

Q. Now that, you say, gives a good idea of the old Mustinka river before its confluence with Twelve Mile creek but after its confluence with Five Mile creek?

A. Yes sir.

Q. Now I want to ask you, Prof. Bass, from your observation there, which is the principal stream?

A. Twelve Mile creek.

Q. How much larger is it than the old Mustinka river, just in a general way?

A. The channel is several times as large as that of the old Mustinka.

Q. And the quantity of water carried by it?

A. At the time I saw it it was many times that of the old Mustinka.

Q. Which would you say, from your observation there, was the principal st-eam, and which the tributary?

A. From an observation of those various streams, as indicated by the photographs of exhibits just presented, Twelve Mile creek has a wide deep channel which extends from the south continuously around the bend or loop, which has been referred to many times, while the old Mustinka and Five Mile creek have *have* comparatively shallow channels in the vicinity of the confluence.

Q. Have you any other picture of the river at this point and after the confluence of the Upper Mustinka with Twelve Mile creek?

A. Yes sir, Exhibit 58. This exhibit shows the old Mustinka river looking south from a point in the Southeast quarter of Section 1-128-46, which is a point on the Teskey farm shown on Defendant's Exhibit No. 4.

1247 Q. Just what direction from the Teskey house?

A. West of the Teskey house.

Q. Did you make an observation of the point which has been described here as east of the Teskey house at the Southeast corner of Section 1?

A. Yes sir.

Q. Township 128-46?

A. Yes sir.

Q. Where the water is said to have crossed over to the north into the Rabbit river?

A. Yes sir.

Q. What is Defendant's Exhibit 59?

A. That is a photograph of the culvert crossing the east and west road immediately west of the section corner. The section corner is at about the point where the automobile is standing in the left of the picture.

Q. That is the section corners of 1, 6, 12 and 7?

A. Yes sir.

Q. And that is the culvert described by Mr. Ralph and some of the other witnesses as the point where the water went through in 1916?

A. Yes sir.

Q. What is the bridge shown at the left of the picture?

A. That is a bridge acrossed the ditch running east and west immediately south of the section line at this point.

Q. Did you make some observations at that point as to whether the water had gone north into the Rabbit river in the spring of 1917?

A. I judged that it had. There was considerable scouring of the north side of this culvert and the water had certainly gone north through it.

Q. Did you observe the grade was washed away at the ends of the culvert?

A. It apparently had been washed out and been replaced.

Q. Did you take some further photographs of the river around the northerly bend?

A. Yes sir.

Q. What is Defendant's Exhibit 60?

A. That is a photograph looking west, on the south line of
1248 Section 2-128-46, taken from a point on the east bank of the old Mustinka channel, showing an old bridge washed down during the previous flood from a point about a mile above this place.

Q. And washed out into the field?

A. Yes, and indicating the height*h* of the water as it passed down the channel.

Q. How far from the main stream itself was this bridge?

A. I judge about two hundred feet.

Q. What is Defendant's Exhibit 61?

A. That is a photograph taken at the confluence of the old Mustinka river with the cut-off ditch. The old river is shown at the right and the cut-off ditch at the left of the photograph. This photograph was teken on May 28, 1917.

Q. Which confluence is that, the beginning of the new cut-off or the end?

A. That is at the lower end of the cut-off.

Q. Where it flows back into the Mustinka Channel?

A. The westerly end.

Q. What is Defendant's Exhibit No. 62?

A. That is a photograph taken on the north line of Section 19-128-45, at the point of confluence of Twelve Mile creek and the old State Ditch, looking south. Twelve Mile creek is shown in the center and right of the picture and the old State Ditch No. 19, or the upper section of the Mustinka ditch, is shown coming in from the left of the photograph.

Q. Is the stream shown near the center of the picture Twelve Mile creek did you say?

A. Yes sir.

Q. What is Defendant's Exhibit No. 63?

A. That is a photograph of Twelve Mile Creek, taken at or near the southeast corner of Section 18-127-45. The banks of Twelve Mile creek are about fifteen feet high at this point.

Q. This is a bridge on what is called the Herman-Wheaton road?

A. Yes sir, about six miles south of where Twelve Mile creek crosses the Mustinka ditch.

Q. What is Defendant's Exhibit 64?

A. It is a photograph of Five Mile Creek on the south line of Section 13-127-45, looking north. I have a note on here that the water is twenty feet wide and two feet deep.

1249 Q. What is the height*h* of the banks?

A. Banks five to six feet high, well-defined, and flow of the stream rapid.

Q. What is Defendant's Exhibit No. 65?

A. This is a photograph of the Great Northern Railway crossing of the Mustinka northwest of Norcross. There is a note on here stat-

ing that the water is about twenty feet in width and two and a half feet deep, banks, four to five feet high.

Q. Now that is over the old Mustinka, as I understand it, before the beginning of any part of the ditch?

A. Yes sir.

Q. What is Defendant's Exhibit No. 66?

A. That is a photograph of the channel of the Upper Mustinka river above the beginning of the upper section of the Mustinka ditch in Section 20-128-44. It has a width of about twenty feet and a depth of about five feet.

Q. Now that, as I understand it, is just before the beginning of the very upper end of the ditch?

A. Yes sir.

Q. Taking Exhibits 63 and 66, and comparing them, professor, what would you say as to what they show?

A. These two photograps are taken at approximately equal distances from the confluence of Twelve Mile creek and the upper Mustinka river and show the relative size of the channels of the two streams at an equal distance from their common confluence.

Q. That is Exhibit No. 63 shows Twelve Mile creek at about the same distance from the confluence as No. 66 shows the Upper Mustinka?

A. Yes sir.

Q. Will you state something of the width of each stream at these points?

A. In Exhibit No. 63 the distance acrossed from abuttment to abuttment in Twelve Mile Creek is 62 feet, and the bottom of the channel is approximately 13 feet below the top of the ground at that point. The view shown in No. 66 cannot be iden-fied by the cross-section which we have. A note on it states that the channel is twenty feet wide and five feet deep at this point.

1250 Q. What is Exhibit No. 67?

A. That is a photograph at the south end of the beginning of the old Mustinka ditch, Section 20-128-44.

Q. And Exhibit No. 67, as I understand it, is the very beginning of the first section of the Mustinka ditch which would be somewhere in the neighborhood of twenty years old, according to the testimony here?

A. Yes sir.

Q. What is Defendant's Exhibit No. 68?

A. That is a photograph of the old Mustinka river near the Northeast corner of Section 26-128-44, looking north. This is a photograph of the Mustinka river east of the Great Northern Railway.

Q. About how far east of Norcross?

A. About two miles in a direct line east of Norcross. The stream is about twenty-four feet wide, the east bank ten feet high and the west bank four feet high. The water at this time, May 29, 1917, was about two feet deep with a sluggish flow.

Q. What is Defendant's Exhibit No. 69?

A. No. 69 is a photograph, looking north from the south line of Section 14-128-43, showing the Mustinka valley at that point.

Q. That is before the turn of the Upper Mustinka to the west?

A. Yes sir. It gives a general idea of the country in that vicinity.

Q. That is, this gives an idea of the depression through which the upper Mustinka runs at that point?

A. Yes sir.

Q. Now I think I omitted one photograph of the Mustinka river around this northerly bend in the town of Monson in Traverse county. We will go back to that. What is Defendant's Exhibit No. 70?

A. Exhibit No. 70 is a photograph of the old Mustinka channel near the southwest corner of Section 2-128-46, looking south.

Q. Now have you another photograph going on around that bend and proceeding southerly toward the outlet of the cut-off ditch?

A. Yes sir.

1251 Q. What is Defendant's Exhibit No. 71?

A. It is a photograph of the old Mustinka channel near the south line of Section 14-128-46.

Q. How far is that from the outlet of the cut-off?

A. It is about eight or nine hundred feet north of the confluence with the west end of the cut-off.

Q. I believe it has been testified here, Prof. Bass, that at a point a thousand feet above the outlet of this cut-off the channel of the old river is practically indiscernible—can't be found. What about that?

A. I saw it there.

Q. Well marked?

A. Yes sir.

Q. Water flowing through it?

A. Yes sir.

Q. Banks well-defined?

A. Yes sir.

Q. As shown in this photograph No. 71?

A. Very much the same.

Q. At the time you made this examination of this area and took these photographs did you observe the relative quantity and flow of the water through this upper two and a half miles of the new section of the ditch called the cut-off and the bend of the river around the loop to the north?

A. I should judge the quantities flowing in each of those two channels were about the same at that time.

Q. Now are you able to form an opinion as to the relative quantity of water flowing in each of them in times of flood?

A. I made some calculations, yes sir.

Q. State what those calculations were?

A. I have assumed the condition when the water coming down to the confluence of Twelve Mile creek with the upper section of the new Mustinka ditch was at high stage and the water flowing from that point partly around the bend and partly through the cut-off ditch to the point of confluence and continuing on down the

1252 channel of the Mustinka. At such a time practically all of the water from the Mustinka watershed arrives at this point.

Twelve mile creek receives the water of Five Mile creek through County Ditch No. 23. A considerable portion of the flow of the upper Mustinka river arrives through the upper Mustinka ditch known as State Ditch No. 19, although a considerable portion of it in flood finds its way through the flood channel to the north, the old channel of the Mustinka. The condition in the channel at the northerly part of the Bend at the time of flood is that it is full to the banks and overflowing, as has been testified here. This channel when it is flowing full, as nearly as I can estimate, has at least a carrying capacity of 1,500 second feet, and possibly somewhat more. So that in time of flood when the banks are full and there is no considerable overflowing of the banks this amount of water is going around in this direction. The profile of the cut-off ditch, as determined from surveys made, and as explained in the testimony here already given, together with the cross-sections actually surveyed and measured indicated a maximum carrying capacity at the same time of 1,000 second feet. So that the carrying capacity of these two channels in the flood is somewhere in the vicinity of 2,500 second feet. The larger part of which total, as has already been indicated, would be carried by the old channel around the bend.

Q. Now will you give us your calculation of the carrying capacity of the old channel around the bend?

A. A number of cross-sections of this channel around the bend have been taken and the water has been assumed at the top of the banks. Three cross-sections were taken at the northerly extremity of the bend, and with the water at the top of the banks at an elevation of 998, each of these cross-sections give an area of approximately 1,100 square feet. Two cross-sections were taken to the south farther around the bend, one near the interception line between Section- 11 and 14 and another 200 feet north of the line of Section 23. All of these are in 128-46. Now we defined the calculation into two main parts. We have taken these three cross-sections at the northerly end of the bend, each of which show about 1,100 square feet, and taking the flattest effective slope at any point there we find that, using Kutti's formula, with a coefficient of roughness of .035 and a slope of .000083, that we get a coefficient of 66.9 to apply to the Chezy formula; that the hydraulic radius is 7.4 and that the resulting velocity is 1.66 feet per second. This gives us a carrying capacity at that point of 1,825 cubic feet per second.

1253

In the second part of the calculation, including the two cross-sections mentioned as being in Section- 11 and 14, we have taken the channel alone, which is smaller, but the channel there is in a flood plain and at a lower elevation than the cross-sections taken above, and at that point with a slope of .00026, using the same coefficient as before, we find that we have a velocity of 2.31 second feet, and in the minimum section which we found we have an area of 580 square feet. This gives a carrying capacity of the channel alone at that point of 1,340 second feet. As I have just stated, there is some flooding apparent in the channel at this point, causing a certain amount of backwater in the water immediately above it, so that we have assumed, that, finding a carrying capacity of the channel of

1,825 second feet as it comes around the bend, and 1,340 feet below, not having any gaugings at all, that a safe assumption for the carrying capacity of this channel would be between those two values, and we have assumed it at 1,500 second feet as a minimum.

Q. Now you gave the cut-off ditch, the carrying capacity of that at 1,000 second feet. Will you kindly give us your figures on that?

A. I calculated the carrying capacity of the cut-off ditch on the basis of the profiles and cross-sections which have been submitted as shown on Defendant's Exhibits Nos. 31, 42 and 44. The profile of the cut-off ditch has been divided into sections as detailed in the testimony already. In order to get at the elevation of the water surface so as to make comparative figures with that of the carrying capacity of the bend, we have assumed the elevation of the water as it enters the bend at the confluence of the Twelve Mile creek with the old Mustinka river at 998, and then allowed a hydraulic gradient up and back along the Twelve Mile creek to its confluence with the cut-off and have arrived at an elevation of the water surface there of 1,002.1, giving a depth in the cut-off of 10.7 feet at that point. Now the slope of the bottom of the cut-off ditch for the first 1,800 feet is negative and the slope of the succeeding sections are somewhat variable, as given before and by making an adjustment of the fall,
1254 taking the assumptions as to depth already mentioned and assuming a co-efficient of roughness of .028 and *and* hydraulic radius consistent with the cross-sections already shown I have obtained the figure of 1,000 second feet for the maximum discharge of the cut-off ditch under the conditions named.

Q. There has been some testimony by the witness Ralph that the fact that the first 1,800 feet or thereabouts of the cut-off showed a negative or backward slope would have no effect on the carrying capacity of the cut-off. What is there to that?

A. I haven't found it that way in my experience.

Q. Explain why?

A. It simply means that the water has to overcome the obstacle in passing along the ditch. As you go downstream if you encounter an obstacle it has the effect of raising the water surface at the cross-section where the obstacle exists, which means a flatter hydraulic gradient and a lesser velocity. A negative gradient is equivalent—has an effect similar to that of a submerged dam at the lower end of the reach under consideration.

Q. Is the average slope of a cut-off channel like this, and with the circumstances as we find them above the beginning of the cut-off channel a proper measure or gauge by which to determine its carrying capacity?

A. No sir.

Q. Why not?

A. For the reason that the flat slope, the flat longitudinal slope of the channel in the upper part tends to hold back the water more than would be the case if the slope continued on the average from the beginning to the end.

Q. Now might there be a greater amount of water than this 1,500 second feet going around that bend, Prof. Bass?

A. Yes sir. I think there might in case the cut-off ditch were to be destroyed. The water would go in larger quantities from the point of the confluence of Twelve Mile creek and the present inlet to the cut-off ditch, pass the northwest and flood over the banks of the river at the bend. Part of that water would go acrossed the divide into the Rabbit River and part of it would go acrossed the peninsula extending from the south into this bend, as it has been testified
1255 it did go in the spring floods of 1917 and 1916 through the various flood channels shown in the central part of this peninsula leading back into the Mustinka river and its flood plain near the lower confluence of the cut-off ditch with the Mustinka river. In that way I believe that a quantity of water considerably in excess of 1,500 second feet might be carried in that way around the bend. I wouldn't want to say how much more, but very much more than 1,500 second feet I would say could be carried around the bend.

Q. Now with the presence of the cut-off there it has been testified here that in 1915, 1916 and 1917 considerable quantities of water did overflow into the Rabbit river from around that bend. That would indicate, I take it, that considerably more than 1,500 second feet were going on around the bend?

A. That would depend on the elevation of the water at that time. Now the water goes over into the Rabbit river, as shown on this map, when its elevation rises somewhat above 998, possibly 998.3 or 998.4, at which time the Mustinka river at the bend would be just about full. If it raised a foot more there would be an increased amount of water going over to the Rabbit river, and there would also be an overflow of the banks at the south and west and the water thus overflowing would rejoin the river farther down.

Q. What would you say as to the operation of this cut-off channel in the early spring at the time of the breadk-up as compared with that of the river around the bend?

A. It has been testified to here that in the early spring the cut-off ditch is filled with snow and ice from a length of time of from ten days to two weeks after the water is freely flowing around the bend and flowing over into the Rabbit river. It has been testified that that happened in the spring of 1916 and 1917, and since the record of the floods in that river show that the peak existes only about a week anyway, I would judge that the peak of the flood passed before the ice disappeared in the cut-off ditch.

Q. How did you account for this river channel around the bend becoming operative a considerable time before the cut-off ditch?

A. The only explanation I know of is that the ditch runs east and west, and it is deep, and the sunlight has no opportunity to
1256 get in and thaw the snow and ice, whereas the channel of Twelve Mile creek and the Mustinka river around the bend is very wide—from a 100 to 200 feet or more in width, and shallow; and in a large part it runs north and south and the sunlight has an excellent opportunity to get in and break up the snow and ice.

Q. Is there a method of ascertaining the quantity of the flow in the river lower down so it can be estimated whether the channel of the old river was exceeded in these flood times, and if so, to what extent,

and thereby some estimate given of the quantity of water that passed through the cut-off in these flood times—and if so, what?

A. There are records of gaugings made by the United States Geological Survey at a point several miles below the cut-off.

Q. When?

A. Starting June 7, 1916, and continuing up — the present time.

Q. You have a statement of those gaugings have you?

A. Yes.

Q. You may refer to that and later we will put in a certified copy of the records themselves?

A. These gauges show flood stages in the Mustinka river at the point mentioned in the latter part of June and the 1st of July, 1916; again in the latter part of March and the first part of April, 1917.

Q. I think you had better state a little more definitely the point where these gaugings were taken, Professor Bass, so it will be plain that they were taken much below the outlet of this cut-off and the point where the river comes around the bend?

A. These gaugings are taken in two places in the river, first in section 23-127-47, just about two miles southwest of Wheaton, and again at a river crossing between Sections 7 and 8 where the river crosses the section line between Sections 7 and 8, 127-46.

Q. Known as the Heggen bridge?

A. Yes. Now in the flood of the summer of 1916 there obviously was no clogging of this ditch by ice or anything else and if we assume that the carrying capacity of the river channel around the bend was 1,500 second feet, there would be, according to these records, four days in which the capacity of this channel would be exceeded.

1257 Q. Give those days and the amount?

A. Those dates are July 6, 1916, when the measured flow was 1,550 second feet; July 7, when the measured flow was 1,630 second feet, July 8th, when the measured flow was 1,590 second feet, and July 9th, when the measured flow was 1,550 second feet.

Q. Now if the cut-off ditch had not been there and the capacity of the river channel around the bend was only 1,500 second feet this water in excess of 1,500 second feet would have overflowed the river channel and part or all of it would have passed over into the Rabbit river basin?

A. Yes sir, but with the cut-off channel being there this excess of 1,500 second feet could be accounted for by having passed through the cut-off channel. Now as a matter of fact at this time I don't mean to state that on July 6th, for instance when there were 1,550 second feet recorded in the river below that 1,500 of those second feet went around the river channel and 50 second feet only went through the Mustinka ditch, because there wasn't any such division at that time—any such proportional division. But I do mean to say if the cut-off ditch had not been there that the river channel would have contributed 1,500 second feet and the other 50 second feet might possible not have gotten down there at all, and the same way for the other dates. I simply make that statment to make clear the line of reasoning. Now on all other days during this flood the

capacity of the river channel around the bend was not exceeded by the flow as recorded below at the stations mentioned, and that quantity of water would clearly have gone down the river channel and reached Lake Traverse whether the ditch had been there or not. This excess of these four days would result in raising the level of Lake Traverse something like ⅜ of an inch in the summer flood of 1916, assuming the lake to be at an elevation of 976 with the areas as mentioned in the testimony given yesterday. Now for the other flood under consideration, that of the spring of 1916, there are no gaugings available, but there are gaugin-s available for the spring flood of 1917, and the same line of reasoning applied to the spring flood of 1917, in which the quantity recorded exceeded 1,500 second feet on March 30, 31st, April 1st and 2nd——

Q. You better give the amount on those dates?

A. The amount on those dates being respectively 1,597
1258 second feet; 1,820 second feet; 2,230 second feet; 1,962 second feet.

Commissioner: You refer to the government readings there?

A. Yes sir, I am referring to the U. S. Geological Surveys.

Q. In how many days?

A. Four days. (Continuing answer started above) would indicate a rise in Lake Traverse due to this excess above the carrying capacity of the Mustinka around the bend of about two inches, provided that the cut-off channel was clear. However, it is by no means evident that the cut-off channel was clear or operative at the time, and I believe that all of these waters may have gone around the bend by flooding and going acrossed the peninsula in the manner previously referred to, although I do not want to state that as a fact. It may or may not have gone through the cut-off, or it may or may not have gone around the bend.

Q. Now, according to that reasoning, in the spring of 1917, assuming that the cut-off channel was fully operative and taking the gaugings of the U. S. Geological Survey, this cut-off may have resulted in raising the water of Lake Traverse about two inches during the flood times?

A. Yes sir.

Q. And what elevation did you assume for the lake surface?

A. 976.

(Adjournment taken until 2 p. m.)

October 2, 1917, at 2:00 p. m.

FREDERIC H. BASS, recalled for further direct examination, testified as follows:

Examined by Mr. Palmer:

Q. You have spoken of the gaugings taken in the Mustinka river from June 6, 1916, to June 6, 1917, have you make a diagrammatic plat of the gaugings taken?

A. Yes sir.

(Defendant's Exhibit 72 is marked.)

1259 Q. What is Defendant's Exhibit 72?

A. Defendant's Exhibit 72 is a record of the daily precipitation, run-off and temperatures of the Mustinka river basin June, 1916, to June, 1917. The precipitation and temperature records are taken from United States Weather Bureau reports and the run-off records are taken from the gaugings made by the United States Geological Survey in the Mustinka river as previously referred to. This rainfall was taken at Wheaton, Campbell, Morris and this is an average of the precipitation at those places.

Q. Just describe briefly what is shown by the vertical black lines.

A. Vertical black lines indicate the amount of precipitation in inches on the day which is indicated by the horizontal scale at the bottom of the diagram at the extreme left of the diagram.

Q. The black irregular line passing through these heavier vertical lines, what is that?

A. That line indicates the run-off in second feet in the Mustinka river as made by the United States Geological Survey. The date is indicated as in the precipitation records and the scale of second feet is shown on the left of the diagram.

Q. Now, the still more irregular line at the top what is indicated by that?

A. It indicates the daily temperatures at Wheaton; the date is indicated as in the precipitation diagram and the temperature scale is shown at the left.

Q. Have you made a compilation of the precipitation in this area for the period from November 1st, 1916 to April 1st, 1917, and from November 1st, 1915, to April 1st, 1916, so as to compare the amount of precipitation for those two periods?

A. Yes, sir.

Q. What difference do you find, approximately?

A. Over the whole drainage area of Lake Traverse I find an excess precipitation in these months, 1915 to 1916 over that of 1916 to 1917 of approximately 30 per cent. The total precipitation in these periods, November 1st, 1915 to April 1st, 1916, and November 1st, 1916 to April 1st, 1917, are respectively 5 inches and 3.89 inches, determined by ishoyetal lines. The difference in the drainage area of the Mustinka river is, however, something less
1260 than that. I haven't calculated that; it is something less than that, probably about 25 per cent.

Q. That is, in making this compilation you have used what stations, Professor Bass?

A. I have used Beardsley, Campbell, Wheaton, Morris, Fergus Falls, Britton, Milnor, Wahpeton and Roslyn. If I were to use Beardsley, Campbell, Wheaton and Morris only the difference would be less, the excess would be less.

Q. You say it would be about 25 per cent difference?

A. About 25 per cent.

Q. And Beardsley, Campbell, Wheaton and Morris are the stations distinctively within this Mustinka drainage area?

A. They are the stations by means of which we judge of the

precipitation in this drainage area, in the Mustinka drainage area, as distinguished from the whole Lake Traverse drainage area.

Q. Reasoning from that difference in precipitation how much would this excess water over the amount carried by the Mustinka river channel around this bend raise Lake Traverse in the spring flood of 1916?

A. It is impossible to state that with any degree of accuracy. There isn't any way known to me by means of which that can be done with accuracy but it seemed necessary to make some sort of an estimate and I have made an estimate which I consider to be liberal and I have allowed that the excess in 1916 over that of 1917, based on an addition of 25 per cent run-off, would be 50 per cent, which would account for a raise of 3 inches in Lake Traverse in 1916 as against 2 inches calculated in 1917, provided that the cut-off was in operation at that time and not filled with snow and ice.

Q. That is 3 inches in the spring flood of 1916?

A. Yes.

Q. And have you made a compilation of the precipitation in the months of May, June and July, 1915, and May, June and July, 1916, so as to arrive at some estimate of the amount of the summer flood of 1915 as compared with the summer flood of 1916?

A. Yes, sir, and I find that the precipitation in these three months was practically the same in each year. I would not express an opinion that the summer flood of 1915 was substantially different from that of 1916, so far as exceeding the capacity of the channel of the Mustinka river at the bend is concerned.

1261 Q. And in 1916 summer flood, your estimate is that it raised the water in Lake Traverse about three-eighths of an inch, I believe?

A. Yes, sir.

Mr. Palmer: I think I did not formally offer in evidence these photographs, Exhibits 45 to 71 inclusive and I wish to do so at this time. I also offer in evidence Defendant's Exhibit 72.

Q. There has been some testimony here, Professor Bass, of the overflowing of an area described as the flood plane of the Mustinka river from the outlet of the cut-off ditch down to the railroad bridge northwest of Wheaton and at times somewhat below that. Have you prepared a map showing that area of overflow and the extent of it?

A. Yes, sir.

(Defendant's Exhibit 73 is marked.)

Q. What is Defendant's Exhibit 73?

A. That is a map of the Mustinka flood plane northeast of the Chicago, Milwaukee & St. Paul railroad.

Q. And it has been spoken of here as extending northeasterly to what is known as the Swede church?

A. Yes, sir.

Q. Where is that church?

A. I think that is in the northeast corner of Section 23.

Q. And just south of the outlet of the cut-off?

A. Yes, sir.

Q. From your observation and study of the location there, what is the cause of such overflow, how is such overflow accounted for?

A. By the lack of capacity in the rectified Mustinka river to carry the water coming to it.

Q. Why? Why do we find that lack of capacity?

A. The channel was not dug large enough to carry the water coming down.

Q. And in times of flood, what would be your idea as to the comparative carrying capacity of this rectified channel and the
1262 channel as it was in a state of nature there?

A. I understand you mean at the time when the flood plane is full of water?

Q. Well, in times of high water.

A. In times of high water, when the channel is overflowed?

Q. Yes.

A. It would be very difficult to estimate the carrying capacity of the combined river channel and flood plane or the combined capacity of the rectified river channel and flood plane and I couldn't say that one would be very much different from the other.

Q. Why?

A. I am speaking of the time when the flood exists. As the flood rises, of course, the rectified river channel has a greater capacity than the old river channel until such time as it overflowed but after the flood has passed over the banks of the channel, either before or afterwards, the discharging capacity is determined more by the area at the outlet than by the size of the channel through the flood plane.

Q. What do you mean by the area at the outlet?

A. I mean the square feet, the cross-section at the outlet.

Mr. Palmer: We offer in evidence Defendant's Exhibit 73.

Q. Have you made an estimate of the comparative amount of time of flow of the water from the beginning of the cut-off ditch at Twelve Mile creek down to the lake under present conditions and under natural conditions?

A. Yes, sir.

Q. Will you state that please?

A. I have estimated the time of flow under natural conditions from the point where the cut-off ditch at its upper end intersects Twelve Mile creek and the lake as approximately 18 hours and the time at present which part of the water takes in flowing from the same point to the lake, the part which flows through the cut-off to the lake, as 9 hours and the part which flows around the bend to the lake, which is a larger amount than that which goes through the cut-off ditch, as 13 hours.

Q. There has been some testimony here, Mr. Bass, of a flood condition in the Bois de Sioux valley lasting for some weeks or months. What effect would this change of a few hours of time in the flow of the waters from the point mentioned have on such a circumstance as that?

1263 A. I think it would have an inappreciable effect.

Q. Why?

A. Because this is a question of hours, the time in hours, and that is a question of months.

Q. Professor Bass, you have examined this map, Complainant's Exhibit 1?

A. Yes, sir.

Q. You have been over and examined the territory which is represented on this exhibit in light blue shading and which the witness Ralph and some of the other witnesses designated as the delta zone, have you?

A. Yes, sir.

Q. How thorough have you examined that area?

A. I have driven and walked across it east and west probably 6 or 8 times, and north and south 4 or 5 times, stopping to examine certain points which seemed to be of interest, taking photographs which have already been submitted in evidence, talking with residents to gain information.

Q. It has been testified here that this area shaded in light blue was in natural conditions a large swampy area covered with rushes and aquatic grassed and submerged in greater part during a considerable portion of each year and unfitted for agricultural purposes, unfitted for human habitation. What would you say as to that statement?

Mr. Boutelle: Without questioning the right of counsel to assume any hypothetical state of facts, this question is objected to on the ground that counsel has drawn very largely on his imagination.

A. I have no reason to believe that it was.

Mr. Palmer:

Q. What did you find?

A. I found an area that was covered with what seemed to me to be prosperous farms, with the exception of a few sections of land along the upper Mustinka river.

Q. And those few sections were what ones?

A. Those were particularly Section- 20, 21, 22, 23, and part of 24, part of 27, and part of 28, in Township 128, Range 45.

Q. That is the township of Redpath?

A. Town of Redpath.

1264 Q. And is that the area that has been described here as the Redpath sloughs?

A. Yes, sir.

Q. And how extensive an area did you find there in those sloughs professor?

A. I didn't measure it but I should judge it to be about 5 sections, 5 square miles.

Q. And of what character is that land?

A. That land is more nearly level than the rest of the area de-

scribed except that land which is right along the channel of the upper Mustinka in Sections 23 and 24.

Q. Was it swamp land or was it in general character like the lands surrounding it?

A. When I visited that on my first trip some of it seemed to be swampy but later in the spring we drove across some of it with an automobile.

Q. And is that all of the swampy area that you found on this area that has been spoken of here as the delta zone?

A. On a later trip made about the 1st of August I did find land which, although not wet at that time on account of its being a dry season, appeared as if it might have been swampy in a wet season in Sections 15 and 16 in Redpath township.

Q. Now, the lands which you found there in '15 and '16 appeared to have been wet from what waters?

A. From the overflow of the upper Mustinka.

Q. Does that go back into the Mustinka, that overflow at those points?

A. A considerable part of it, I would judge, did from the general contour of the country there.

Q. And in Sections 15, 14 and 13, I will ask if at those points you found any evidence of overflow of water to the north and northwest?

A. There were various flood channels in that vicinity and I believe that at times of extreme high water that water will escape also in them from the Mustinka river, although I can't be certain about that.

Q. What would be the ultimate destination of that water?

A. That water would travel into the Rabbit river.

Q. In you- study of this Rabbit river drainage area, did you determine which was the main channel of the Rabbit, where the main water came from?

A. I can't say that it came from any one place. It appeared to me to come mainly from the east and southeast portions of the drainage area, coming from a number of different sources.

1265 Q. Now, bearing upon this drainage area into Lake Traverse and the Boise de Sioux valley, I show you defendant Exhibit #22; what is that?

A. This is the advance sheet of the South Dakota-Minnesota Peever quadrangle published by the United States Geological Survey.

Q. I show you Defendant's Exhibit 23?

A. That is the Minnesota-South Dakota Beardsley quadrangle.

(Defendant's exhibit 74 is marked.)

Q. I show you Defendant's Exhibit 74, what is that?

A. These consist of the South Dakota-North Dakota New Effingwell quadrangle, South Dakota-Minnesota-North Dakota Whire Rock quadrangle, advance sheets.

Mr. Palmer: We offer in evidence Defendant's Exhibits 22, 23 and 74.

Q. In making your compilation of the precipitation records upon the area tributary to Lake Traverse and the Bois de Sioux river, what stations did you use?

A. They used the stations of the United States Weather Bureau at which precipitation records were kept which were nearest to this drainage area in all directions during the period from 1893-4 to date, and all of these stations are as follows: Milbank, Milnor, Sisseton Agency, Forman, Power, Ashby, Alexandria, Beardsley, Fergus Falls, Morris, Wahpeton, Campbell, Kidder, Roslyn, Wheaton and Britton.

(Defendant's Exhibit 75 is marked.)

Q. What is Defendant's Exhibit 75?

A. Defendant's Exhibit 75 is a map of the drainage area of Lake Traverse and the Bois de Sioux valleys to Fairmount, showing the United States Weather Bureau stations where precipitation records were obtainable between the years 1893-4 to the present time.

(Defendant's Exhibits 76 and 77 are marked.)

Q. What is Defenedant's Exhibit 76?

A. Exhibit 76 is a chart showing the monthly and annual precipitation in the drainage area of the Red river valley tributary at Moorhead-Fargo, compiled from the records of the United States weather Bureau and the run-off from the drainage area of the Red River at same places compiled from the records of the United States Geological Survey.

Q. Why did you take the station Moorhead-Fargo?

1266 A. I prepared this chart for the purpose of showing that the flood of 1916 was common to the whole upper end of the Red river valley. Moorheard and Fargo are situated on the banks of the Red River of the North about 60 miles north of Fairmount, North Dakota, and down-stream from this portion of the Bois de Sioux valley under consideration in this case. This chart shows the comparison of the rainfall in the years which are particularly under consideration in this case, as compared with previous years showing an increasing rainfall, above the avarage, 1914, 1915 and culminating in 1916, and it also shows the corresponding run-off in the upper Red River valley indicating a higher run-off in the year 1916 than at any period preceding this period during the years 1902 to 1916.

Q. What is Defendant's Exhibit 77?

A. Defendant's Exhibit 77 is a diagram showing the total precipitation on the Lake Traverse drainage area from November, 1913 to October, 1916, inclusive, showing the average precipitation as determined from the stations before mentioned during the years 1893-4 to the present time, and the actual precipitation during the years mentioned, November 1913 to October, 1916. The chart shows the gradually increasing excess precipitation in these years, 1914, 1915 and 1916.

Q. And what indicates particularly the increasing excess precipitation through 1914, 1915 and 1916?

A. The vertical distance between the full line and the dotted line shows the excess in each of these periods.

Mr. Palmer: We offer in evidence Defendant's Exhibits 76 and 77.

Q. You have heard the testimony here, Professor Bass, respecting this flooding of lands in the Bois de Sioux valley in the summer of 1915 and the spring and summer of 1916, the extent and duration of those floods. Now, from your examination and study of this entire area and the precipitation, run-off, flow of the water into Lake Traverse and all those other matters respecting which you have testified, are you able to form an opinion as to the cause of those conditions in the Bois de Sioux valley in 1915 and 1916?

A. Yes sir.

1267 Q. What is your opinion?

A. My opinion is that these floods were caused alomost entirely by the heavy precipitation in the years 1914, 1915 and 1916 which was considerable above the average, as has been shown, and to some extent by the obstructions across the flood plane of the Bois de Sioux valley and possibly to the very slight extent, not more than two or three inches rise in Lake Traverse for a very short period of time, by the construction of the Mustinka state ditch and the ditching operations in the drainage area tributary to Lake Traverse in South Dakota.

Q. From your examination and study of this drainage area and the records of precipitation and all these other facts to which you have testified, are you able to form an opinion as to the recurrence of these conditions in the Bois de Sioux valley?

A. I find that in the years 1893-4 to 1916 and 1917 that there are three series of years which with noticeably high precipitations occur approximately ten years apart. One of them is the period of 1895, 1896 and 1897, another is the period of 1903, 1904, 1905 and 1906, a third is 1914, 1915 and 1916. The first mentioned of these did not appear to be nearly as great as the last two mentioned, so I judge that the periods of flood in this area from these records of the past might recur once in from ten to twenty years.

FREDERIC H. BASS, recalled as a witness on behalf of the defendant.

Cross-examination.

By Mr. Boutelle:

Q. Professor Bass, I understood you to state that you graduated in 1901?

A. Yes sir.

Q. And moved to Minnesota in what year?

A. Same year.

Q. At what time did you become acquainted with the University of Minnesota?

A. In 1901, about September.

Q. And in what capacity?
A. As an instructor.
Q. How long did your consecutive employment by the university of Minnesota continue?
A. Up to the present time.
1268 Q. That university is a state ins-itution?
A. Yes sir.
Q. Maintained by appropriations and monies appropriated by the state?
A. Yes sir.
Q. Your first work was in what line, I mean in the University?
A. Civil Engineering, instructing and surveying.
Q. How long did that continue?
A. Up to about 1910.
Q. During that time was there an established department of Civil Engineering in the university?
A. Yes sir.
Q. And who, if you recall was at the head of that department?
A. There was no head of it.
Q. Was that department then connected with some other which did have a head?
A. It was part of the College of Engineering which part of the time had a head.
Q. And who was the head during that period?
A. The president of the University acted as head of the College for a part of the period and the rest of that particular period up to 1910 the head was Prof. Jones.
Q. And his chair was?
A. Professor of Physics.
Q. In 1910 you became a Professor?
A. About that time. I can't just say what year.
Q. And your department, your chair was?
A. Civil Engineering. I was made Professor of Municipal and Sanitary Engineering at that time.
Q. The Engineering Department of the University since that time has been sub-divided has it not?
A. No sir.
Q. Do they have a department of Hydraulics?
A. No sir.
Q. Did they have a department of Civil Engineering?
A. Yes sir.
Q. Who is the head of the Department of Civil Engineering?
A. I presume I am. I have been nominated for the head of the Department of Civil Engineering. I believe the nomination
1269 has not as yet been confirmed by the Board of Regents.
Q. Is there or is there not, Prof. Bass, any department of Hydraulics in the University?
A. No sir.
Q. What is the department, if that is not the correct term that Prof. Myers is Dean of?
A. He is not Dean of anything.

Q. What is his position?
A. I think his title is Associate Professor of Hydraulics.
Q. Who succeeded Dean Shenehon?
A. As Dean of the Engineering College?
Q. Yes.
A. John R. Allen.
Q. So the head of the Engineering College at the present time is John R. Allen?
A. Yes sir.
Q. Now you state you were appointed, if I understood you correctly, as Professor of Municipal and Sanitary Engineering in 1910 or thereabouts?
A. Yes sir.
Q. And have continued to hold that position to the present time?
A. Yes sir.
Q. What is the general field, if it is susceptible of generalization, Prof. Bass, of Municipal and Sanitary Engineering?
A. Water supply, sewage, municipal and public works.
Q. That is the furnishing of water for municipalities?
A. Yes.
Q. And the sanitary drainage of municipal areas?
A. Yes sir.
Q. Has that been the principal part of your work?
A. You mean in the University?
Q. Yes.
A. Yes sir. During this perior until about two years ago when Mr. Meyers, whom you mentioned, came in. I also did the instruction in hydraulic engineering which he is doing now more at length.
Q. Now Prof. Bass, you have, as I understood you, had some work outside of your educational work during that period?
1270 A. Yes, sir.
Q. Will you tell me as respects hydraulic work in what lines this has followed?
A. Before coming to Minnesota—I came here at the age of 27 years, —I had about four years' work on an extensive water supply and drainage project in Massachusetts, which I detailed in my direct examination. Since coming to Minnesota I have been engineer and director of the engineering division of the Minnesota State Board of Health for about seven years, and in this capacity I have made a study of the run-off of a number of streams in Minnesota, this study of precipitation and run-off being necessary in connection with the disposal of sewage to determine the dilution and so forth. I had one drainage investigation in the Red River valley. I made one study of considerable mcgnitude for the city of Minneapolis when in 1909 it was necessary to provide a new water supply. That investigation included a study of the MiLacs Lake and its drainage area in respect to its capacity for furnishing water for the city of Minneapolis, a study very similar in many respects to this one in this case. I think that covers in general my experience.
Q. Now Professor Bass, there is no dispute in this case, as I under-

stand it, that the drainage in this area from both sides of the Lake Traverse and the Bois de Sioux is toward the lake and river?

A. No, sir.

Q. There is no dispute as to the direction of flow?

A. No, sir.

Q. There is no substantial dispute as to the character of the land, is there?

A. In general, I should say not.

Q. The general slope of the land in this entire area toward the north?

A. Yes, sir.

Q. And starting from the outlet of Lake Traverse and going down the Bois de Sioux valley to the mouth of the Rabbit River what is the fall?

A. It is nearly eleven feet at the normal stage, subject to corrections as shown on Defendant's exhibits.

Q. Now you told counsel on direct examination something about an adjustment of the sea level datum, which made some difference in the figures. That is an unimportant element in this case is it not, Professor, unless we use one or the other of those in all of our elevations?

1271

A. Yes, I think it is.

Q. So that for the purposes of this case we may assume that the mean level of the waters of Lake Traverse are as stated in the Defendant's answer 974 feet above sea level?

A. From some points of view it might make a difference (referring to the previous question). This difference of levels as applied to the level of Lake Traverse, the elevation of the water surface of Lake Traverse, is about 1.3 feet. Now I presume it does make a difference whether the high water level as shown on Plaintiff's Exhibit 1 of 977, whether that was really 977, 1.3 feet below that or 1.3 feet above it.

Q. Simply to avoid confusion in this case, Professor, this difference in estimation of the water levels must follow one system or the other all the way through or else we shall result in inconsistency?

A. Yes, sir.

Q. In other words, the level of the water would be the same, but computed by one bases it would be one height above the sea level and computed by the other it would appear at a different level?

A. Yes, sir.

Q. Now which of those methods have you taken in the computations that you have given?

A. We have used the corrected elevations.

Q. All the way through?

A. Yes, sir.

Q. And that gives you your normal level of Lake Traverse as what?

A. 973.3.

Q. And what would this level under the old computation be before adjustment?

A. 974.6.

Q. Then I am right, Prof. Bass, in saying that to be consistent

in this case the same system should be followed throughout in all these levels that have been taken where sea level enters in?

A. Yes, sir.

1272 Q. The Rabbit river from the Tintah slough into the Bois de Sioux is approximately of what mileage?

A. I have never estimated that.

Q. Did you ever estimate or examine its fall?

A. Its fall is about forty feet.

Q. You mean through its entire length?

A. I mean from the Tintah slough to its mouth.

Q. The Rabbit river is a stream that has comparatively well-defined banks during a very considerable po-tion of its course, as last indicated, is it not?

A. Yes, sir.

Q. And empties into the Bois de Sioux at the point indicated by the maps north of Fairmount?

A. Yes, sir.

Q. The Mustinka river has its source in what we have termed for convenience the upper part of the moraine zone?

A. Yes, sir.

Q. And flows south through that moraine zone until it turns west flowing through what we have termed the delta zone and then southwest to its outlet?

A. Yes, sir.

Q. The main tributaries of the Mustinka river so far as this case is concerned are the Twelve Mile and Five Mile creeks?

A. Yes, sir.

Q. What is the approximate length of Twelve Mile creek?

A. About twenty-five miles from its southerly source.

Q. And Five Mile creek?

A. About twenty-five miles.

Q. And what is the fall of those two streams, approximately?

A. The fall of those two streams is approximately two feet per mile along the channel.

Q. What is the fall of the Mustinka river from the northern part of the moraine zone to the point where it turns west?

A. Approximately two feet to the mile.

Q. The channel of the Mustinka river in the moraine zone is comparatively well-defined?

A. Yes, sir.

1273 Q. And it loses its well-defined channel after it turns west?

A. Yes, sir.

Q. Is that the case before it reaches the crossing of the Great Northern at or near Norcross?

A. No, sir.

Q. The disappearance of the channel of the Mustinka lies between the crossing of the Great Northern and several miles west of there?

A. I don't think it does disappear.

Q. You mean by that that you can find the channel in that area?

A. Yes, sir.

Q. At many places in its course in a state of nature the banks are comparatively low, are they not?
A. Yes, sir.
Q. And shallow?
A. Yes, sir.
Q. And it has tributaries?
A. Yes, sir.
Q. And on either side there are various flood channels, or coolees, or whatever you call them, where the water is spread out over the surface?

Mr. Palmer: What are *are* you talking about?
Mr. Boutelle: This area west of the Great Northern crossing.

A. There is a flood channel along the stream and there are flood channels extending to the northwest from the upper Mustinka in that area.
Q. What is the elevation of the land, taking a distance of three to six miles west as compared with the elevation of the banks of the Mustinka in a state of nature?
A. It is the same.
Q. Well, you don't mean by that, Professor, that the bottom of the Mustinka river was no lower than the level of the lands on either side?
A. I thought you asked me about the banks. You mean what was the elevation of the bottom?
Q. Yes.
A. The bottom of the river was from two to five feetbelow the surrounding land, as I saw it.
1274 Q. Is the land on either side of the river through that area comparatively level, to the north and south?
A. It has a slope of approximately five feet to the mile to the northwest.
Q. The upper Mustinka river drains this moraine zone?
A. Part of it.
Q. And the waters which followed the natural channel would go through this channel of the Mustinka river that you have been describing?
A. Yes sir.
Q. In times of flood or high water, in a state of nature, when the discharging capacity of the natural channel of the Mustinka was exceeded what became of the waters?
A. The water would follow the flood channels of the Mustinka following the same general direction that the channel itself followed, to the northwest.
Q. And to what depth might those channels be filled?
A. I have no way of making any correct estimate at all.
Q. As a matter of fact you never were on the ground during a flood season?
A. No sir.
Q. And the extent to which those flood channels might be filled or the extent to which the Mustinka would overflow it's banks and

the area which would be inundated would largely depend on the amount of water, wouldn't it?

A. Yes sir.

Q. And we should naturally expect to find under those conditions in season of excessive precipitation a run-off which would overflow larger areas than in times of lesser precipitation?

A. Yes sir.

Q. And you wouldn't, Professor, either from observation or otherwise, undertake to fix any arbitrary limits to the area of overflow, would you?

A. No sir.

Q. The physical conditions there are such that given a volume of water exceeding the channel capacity of the old Mustinka in a state of nature, there must have been overflow conditions?

A. Yes sir.

1275 Q. And that is self evident from the contour of the land and from the conditions that are observable at the present time?

A. Yes sir.

Q. And without a knowledge of the conditions of precipitation at a particular time, or the run-off, or the discharge of the Mustinka at this point, it would be impossible for you to state as to the area of overflow?

A. Yes sir.

Q. You mean that it would be possible or impossible?

A. It would be impossible.

(Adjournment taken until 10 a. m., October 4, 1917.)

October 4, 1917, at 2 o'clock p. m.

FREDERICK H. BASS, being recalled for further cross-examination, testified as follows:

Examined by Mr. Boutelle:

Q. Professor Bass, in round figures, you give the watershed of the Mustinka river in square miles as what, the entire watershed?

A. Approximately 793 square miles.

Q. Based upon the computations that you made from the readings taken near Wheaton in 1917 and with certain allowances for estimates of excessive precipitation of 1916 over that of 1917, you figured the discharge about 2,200 second feet, wasn't it?

A. Yes, sir.

Q. For the sake of getting round figures, if we take the area of the watershed in square miles as 800 and the discharge at the outlet is 2,400 second feet, it would indicate 3 second feet per square mile run-off, wouldn't it?

A. Yes, sir.

Q. You have divided this watershed into three practically independent areas, one tributary to what we call the upper Mustinka, one the Five Mile creek and one the Twelve Mile creek?

A. Yes, sir.

1276 Q. And you take into the upper Mustinka how many miles?

A. 203 square miles.

Q. Then if we had 200 square miles in that upper Mustinka with a run-off of 3 second feet down to the point just west of the Norcross crossing, our discharge would be at that point theoretically and approximately, 600 second feet?

A. Yes, sir, although this 203 square miles was figured up to the confluence of the various tributaries.

Q. That would vary our round figures to some extent?

A. It would be something less than that.

Q. I wish you would tell me, taking an assumed case of a discharge at the point which I am indicating of 600 second feet for ten days, how much area in square miles that volume of water would be sufficient to overflow to a depth of three inches?

Mr. Palmer: That is objected to as not cross-examination and that there is no testimony showing any such discharge for a period of ten days or any other time.

A. Approximately 70 square miles irrespective of the geographis location of the place where it was run in.

Mr. Boutelle:

Q. I didn't ask you anything, Professor Bass, did I, about geographis location?

A. You said, at this point.

Q. I said, assuming a discharge at this point of a given volume of water, how much area that would be sufficient to overflow to a depth of three inches?

A. You mean a discharge at this point? You didn't mean at this point where the stream crossed under the railroad, you mean as a general question?

Q. Yes.

A. It might be in California, for instance?

Q. No, I didn't speak about California.

A. The only reason that I mention that irrespective of location was that is merely an arithmetical computation, with that many cubic feet per second running continuously for ten days would cover an area anywhere.

Q. That was precisely why I asked you the question.

A. Yes sir.

1277 Q. Given a relatively short period of excessive precipitation or given a case of the sudden breaking up in spring, a run-off of 3 second feet per square mile in the area with which we are dealing would not be unexpected, would it, professor?

A. I think that under such condition that maximum run-off of that amount for one day would not be considered excessive.

Q. And won't you go a little further than that, than one day?

A. Might last for a day and a half.

Q. Your own estimates gave a run-off based on your discharge of about 2200 second feet, didn't it?

A. Yes, sir.

Q. For four days?

A. No, sir, for one day.

Q. Then you wish your testimony left that given an area of this character, the character with which we are dealing, in times of relatively heavy precipitation, excessive precipitation, covering short periods or in times of spring break-up, it would be an abnormal condition to expect to find a run-off of 3 second feet in excess of a day or day and a half?

A. Yes, sir.

Q. Assuming, Professor Bass, that waters were discharged from an outlet at such a point as I have indicated into comparative level area, so that a greater or less extended area was overflowed to a depth of a few inches or more and varying according to the irregularities of the surface, what would be the effect so far as the ultimate run-off or discharge of those waters are concerned?

A. It would depend upon the topographical and climatological conditions at the time.

Q. Well, if the topographical conditions were comparatively level and the water was spread over an area of a good many square miles to a depth of a few inches, you want your testimony to stand that you think that would accom-odate itself to a very rapid run-off, do you?

A. Provided there was a sufficient outlet, yes, sir.

1278 Q. And in your opinion waters spread over an area of that kind would find their natural outlets much more rapidly than though it had a defined and definite channel?

A. No, sir.

Q. Isn't it a fact, Professor Bass, that where water overflows as I have indicated in my question, that it has a tendency to very materially retard the run-off?

A. Any impounding reservoir or basin will of course decrease the maximum rate at which the water runs off over a given area.

Q. Do you intend to testify as your opinion that water spread out over a comparatively level surface in a thin sheet has a run-off in any wise comparable with water that is following natural channels?

A. I don't intend to say that it would be—it would run off at a greater rate at any given time.

Q. Do you intend to say that it would be very materially retarded?

A. It might in some cases.

Q. And wouldn't it generally be?

A. It generally would be retarded.

Q. And isn't that axiomatic and common sense, apart from any expert knowledge?

A. Yes, sir.

Q. Isn't it also true that water overflowing an area such as I have indicated is much more susceptible to the effects of evaporation than water confined in narrow channels?

A. Yes, sir.

Q. And isn't it also true that it would be more susceptible to the effect of soil seepage?

A. Yes, sir; given the same amount of water, you mean, given the same amount of water spread out?

Q. Yes.

A. It will more quickly evaporate and more quickly seep into the ground.

Q. And isn't it also true it is much more susceptible to what we have termed transpiration?

A. Yes sir.

1279 Q. So that the conditions such as I have indicated to you are in reality a retarding element in the discharge of surface waters?

A. Yes, sir.

Q. Now, Professor Bass, assume such an area as we have been discussing here, having a natural channel inadequate to accom-odate the flow of the waters and thus lending itself to the overflow of greater or less areas, and suppose that through that overflow area an artificial channel is constructed having materially greater capacity than the channel of the original stream what would the effect be?

A. Previous to the time when such a channel overflowed its banks to any considerable extent, the channel you indicate would have the effect of carrying off greater quantities of water.

Q. And by the artificial channel overflowing you mean a point where it was filled over its banks, its artificially constructed banks?

A. Yes, sir.

Q. Such artificial channel, notwithstanding its overflow, would not cease to function, would it?

A. It might to a considerable extent.

Q. And it might not to a considerable extent too?

A. In other cases, yes, sir.

Q. Let us apply a little common sense there and see where we land. If we take a channel of nominal depression, practically no banks, which permits its water to spread over wide areas, and substitute an artificial channel of much greater capacity within its banks, the overflow would be less, wouldn't it?

A. Be somewhat less provided the outlet was free.

Q. Provided the outlet was free, of course. If the water was of sufficient depth to overflow the banks and escape we would expect it to be very much less in quantity and we know it would be very much less in quantity than was the original channel, in the same location?

A. I don't think I quite understand the question.

Q. Professor Bass, if we had a given volume of water coming to a given point and seeking an outlet in a receptable that wouldn't hold it and we substitute for the receptable that wouldn't hold it a

1280 receptable that would hold 90 per cent of it, the overflow of the latter case would be very much smaller than the overflow in the first?

A. Certainly.

Q. If such an artificial channel as I have supposed was constructed

in such a way that the water would very largely be carried within its banks, where would the water go?

A. It would flow towards the lowest point.

Q. And by the lowest point you refer to the fall of the ditch, I take it?

A. The point at the end of the fall of the ditch.

Q. In determining the capacity of that ditch, I understand you to testify, that it is necessary to take the level of the bottom of the ditch?

A. Necessary to consider that, yes, sir.

Q. It is very negligible element, isn't it?

A. What?

Q. The fall of the bottom of the ditch?

A. No, sir.

Q. What is the greatest frictional resistence, where water is flowing over water or water is flowing over gravel or sand or silt?

A. That question assumes a channel in the ground?

Q. It doesn't assume anything.

A. Water has to flow through a channel in order to flow, doesn't it?

Q. Take your own assumptions.

A. Water has to flow through a channel in order to flow and that assumes a channel in earth as compared with another channel in water, which is a very indefinite thing.

Q. Well, I will make it definite. Suppose that we had in this particular area a ditch which at its upper end, as we are dealing with it would be toward the east and its lower end towards the west, that the natural fall of the water is from east to west, as we have here, that we had an elevation one foot higher at the western end than it was at the eastern end, do you understand me so far?

A. Yes, sir.

1281 Q. So that instead of the ditch falling in the direction of the natural flow the bottom of the ditch would be up-hill for a foot.

A. Yes.

Q. Then theoretically in the bottom of that ditch we would have a wedge, wouldn't we?

A. Yes, sir.

Q. And that would be one foot at the beginning and taper off to nothing at the upper end?

A. Yes, sir.

Q. Now, suppose that we filled that wedge with gravel so that it was level or a little better than level with a slight fall, would it have any bearing on the flow? What effect would it have on the flow?

A. This wedge is one foot deep at the upper end and this channel is any particular length?

Q. Oh, I am making that arbitrary.

A. Maybe any length?

Q. Yes, sir.

A. And how deep is the water to be?

Q. I haven't got to that yet. I am talking about friction on the water.

A. If that change were made suddenly in the stream the tendency would be to decrease the quantity of water flowing.

Q. In other words, your testimony is that water will run up-hill faster than it would down?

A. I didn't say that.

Q. Isn't that the natural result of your answer?

A. No, sir.

Q. My question was that if you had a ditch bottom on an incline and then filled the incline up what the effect would be on the flow, and I understand you to say it would retard it, and I right?

A. It would retard it.

Q. And I suppose the greater we increase that incline toward the point of natural flow, the greater the retardation?

A. Certainly, because if you did that suddenly you raise
1282 the incline so that you push it above the surface of the ground and there wouldn't be any flowing.

Q. I didn't ask you anything about sudden rising.

A. Yes, sir.

Q. No, sir, I did not, you assumed that, let's get back.

A. You didn't say how long you were going to take to raise that.

Q. Suppose, if that is confusing; suppose we take two channels then we won't have any chance for confusion, one of which has the bottom on an incline, up-hill incline as I have stated, and the other one the wedge filled up. Now, which would accom-odate itself best to the flow?

A. It appears to me there would be less water flowing in the one in which the wedge filled up.

Q. Then what difference does it make whether the bottom of your ditch runs up-hill or whether it is on a level?

A. Because you are assuming at the head of this wedge that you — speaking of, water at a certain heighth.

Q. I haven't assumed any such thing.

A. Well, you can't compare two channels you speak of unless you compare them under the same conditions.

Q. I am not an engineer, I can; it doesn't require any scientific knowledge, it only requires a little common sense.

A. You couldn't compare them properly unless you compared them under the same conditions.

Q. I am simply asking you a question, Professor Bass, bearing on this effect of the level of the bottom of the ditch, if you have a ditch whose bottom had an up-incline against the direction of flow and then fill that incline up to a level so that the ditch was level instead of running up-hill, what the effect on the flow would be.

A. With the water remaining at the same elevation at the top or at the inlet, you would get less flow.

Q. With a level ditch?

A. With a level ditch.

1283 Q. And if the incline of that ditch was down-hill, I take it we would get still less flow, from your philosophy?

A. You might with the——

Q. Then if the fact——

A. I would like to qualify that answer by saying, with the water at the inlet still at the same elevation.

Q. Now, Professor Bass, I haven't said anything to you about water at the inlet.

A. The question can not be fairly answered without some testimony as to the elevation of the water surface.

Q. Why can't it? Suppose that I have an outlet coming down to the point indicated by my hand and at that point I construct an artificial ditch.

A. That is the bottom of what ditch?

Q. That is the bottom of the natural channel or outlet; I construct a ditch, an artificial ditch and I drop the bottom of my ditch a foot lower than the level of my outlet, run it below for a foot, as I have indicated to you.

A. Yes, sir.

Q. What effect does that have on the flow?

A. You are assuming, you have to assume something in regard to the water flowing. You have an unlimited quantity of water flowing, I assume you have plenty of water.

Q. I didn't have but you may.

A. Well, otherwise there might not be any flowing after you had gone through this operation.

Q. If there is no water flowing in a ditch you don't pretend to say that the fact that the bottom of the ditch was up-hill would make any difference on the flow?

A. No, sir. These answeres which are given are assuming that the elevation of the water surface at the upper end of this hypothetical ditch was unchanged.

Q. I don't care whether they are changed or not; I am asking you a plain every-day common-sense question. You have told me the question whether a ditch on the bottom has a slight incline against the direction of flow plays a material part in the flow of the ditch.

A. Yes sir.

1284 Q. Now, I have asked you if we filled that up, or in other words, if the ditch had been constructed level——

A. Yes, sir.

Q. — what the effect would be?

A. The effect then would be to decrease the flow in that ditch.

Q. And if we had constructed that ditch down-hill, it would decrease it still more?

A. I don't think that question is quite fair without further explanation. Here is the bottom end of the ditch, the water is flowing in this direction, that is the slope of the bottom of the ditch at first. Now you raise it up until it is level and I have now compared those two conditions. Your question is that you raise it still further, what will be the effect, and I should say that the water being at the same elevation flowing over the inlet of that ditch, it might be to further decrease it.

Q. You are assuming in your answer a supposititious case where I am creating a dam at the upper end of the ditch?

A. Yes, sir.

Q. I want you to exclude that.

A. And this part that you speak of then is merely one section of a ditch of indefinite length in the middle of the summer?

Q. I don't care, I will take any ditch; take the gutter of your house or any other proposition that you want.

A. I thought this was an entire ditch that you were speaking of, a big ditch.

Q. You can use an entire ditch if you want to reason it out that way. Take any ditch.

A. You can not conceive of water being run into a ditch of that sort without the water at the upper surface having some definite elevation.

Q. You can not?

A. No sir. It has to be a surface of water.

Q. What difference does the level of the bottom of the ditch make if you have to take the elevation of the surface of the water?

A. Because that determines the size of the cross-section to some extent.

Q. We will get back and see if we can't get this thing where we understand it. For certain purposes I am assuming that the bottom of the ditch has a slight incline against the direction of flow
1285 and I have asked you if that incline were eliminated what the effect would be and you tell me you can't answer that without a lot of other qu*a*ifications, is that right?

A. I can't answer it without knowing the initial elevation of the water surface at the beginning of the ditch.

Q. Well, suppose we take it 6 feet?

A. And the ditch is 6 feet deep at the beginning to start with, and you now make it 5 feet deep?

Q. No. I am not talking about depth of the ditch, I am talking about the bottom for the purpose of determining this question of friction.

A. You mean six feet above the bottom of the ditch?

Q. I am simply trying, Professor Bass, to find out what this incline on a bottom of a ditch has to do with flow. If I understand you right, you have told me it didn't make any difference whether the ditch was level or whether it was up-hill?

A. I didn't say that.

Q. It does make a difference whether the ditch is level or whether it slopes on the bottom up-hill or whether it slopes down-hill, doesn't it, speaking generally?

A. Yes, sir.

Q. Because of the up-hill slope on the bottom that I have suggested, I have asked you about the effect of putting in a wedge that would correct the level in gravel the water flowing through that would have a certain amount of friction on account of its contact with the gravel?

A. Yes, sir.

Q. Suppose you filled that wedge with water, where would you get the most friction, from the water wedge or the gravel wedge?

A. I think that the friction on the gravel might be determined fairly easily; the friction on the water would depend upon the con-

dition of the water in that water wedge, whether it were flowing—it would, of course, to some extent throughout that distance of the ditch be projected along with the upper part of the water, which of course would be flowing down-hill and the water in the bottom of that wedge would be going up-hill with the other water.

Q. Wouldn't the same effect exist with the gravel?

A. Gravel wouldn't move, of course.

Q. It wouldn't?

1286 A. Not unless it were very fine and the current pretty swift, it might or it might not. I am assuming it doesn't. Some streams take up sediment and carry it, of course, depending on the swiftness of the stream. In this water wedge we are speaking of, in the upper end of that the water in that wedge would be flowing along with the stream in the upper part of the section, and there would consequently be very little friction between the water in the upper part and the water in the wedge. It would be impossible to distinguish between the two currents, where one left off and the other began. But as you go towards the down-stream part of this wedge where the wedge is narrow and the friction and the gravel at the bottom commences to come into play, there would be more or less eddy currents and mud. So I suppose if it were possible to theoretically determine this you would find that the water at that point would be offering more resistence than the water at the other end, but still it would be traveling along with the other water and it is between those different volumes of water as compared with the thick ground I would say there would be less friction between the volumes of water than there would be between the water and the ground itself.

Q. Then what becomes of the effect, professor, of your incline in the bottom of the ditch except in very low stages of water?

A. We are getting back there to the factor which I wanted to introduce in the question, that was the effect of the level of the water, the amount of water flowing through the ditch.

Q. Is that an answer to my question?

A. Well, your question is as to whether it is important. I might answer it this way, by saying that as the quantity of water in the ditch increases the effect of any given rise such as we have been speaking of becomes relatively less important.

Q. And as a matter of fact, with a nominal rise extending over a long distance, and deep water, water 6 or 8 or 10 feet deep, the bottom of the ditch would cut no figure to any appreciable extent on the velocity of that ditch, would it?

A. If you mean by the words nominal rise an inappreciable rise, I would say an inappreciable rise would cause no appreciable diminution of the flow.

1287 Q. What was the irregularity as you determined it of the bottom of this original Mustinka ditch we have been told so much about?

A. The irregularities?

Q. No, I mean the general, approximate general level of the bottom there we have been told so much about.

A. That ditch has a pretty smooth gradient.

Q. What is its natural——

A. That is, the old original Mustinka ditch down from the point near Norcross down to the Twelve Mile creek?

Q. Yes, I understand there is only one original ditch in the case.

A. It is approximately 6 miles in length.

Q. What is its fall or rise in its length on the bottom?

A. It falls about 24½ feet in that distance.

Q. The old ditch then, has a fall of 24 feet in approximately 6 miles?

A. Yes, sir.

Q. What is its average, as near as you can approximate it, width?

A. It varies from 18 to 32 feet in width on top.

Q. And by on top what do you mean?

A. At the level of the surface of the ground.

Q. And can you give me an idea of its depth taking the average heighth of its banks; I mean the average heighth of its banks, of course, professor, for the whole length of the ditch?

A. From the cross-sections which we have and from having seen it I would say that its average depth was about 6 feet.

Q. When banked full?

A. Yes, sir.

Q. What is the depth of the ditch proper from the surface of the ground, natural surface of the ground?

A. I understood that to be your question.

Q. From the natural level of the surface of the ground the average depth of the ditch you say was what?

A. Six feet.

1288 Q. And what would be the average depth if we took into consideration the additional element of its banks, artificial banks, if it had any, I don't know as it has any?

A. In some places it has banks, spoil banks, some places it has not. It hasn't any continuous artificial banks.

Q. Then your answer to that question would be that throughout its length that ditch would carry when banked full an average depth of 6 feet?

A. Yes, sir.

Q. And I understood you to testify, and if I am wrong in that, correct me, that in your opinion the construction of that ditch had a tendency to retard the flow of the waters coming from the upper Mustinka?

A. I don't think I said that.

Q. If you didn't say so, is the reverse true?

A. That ditch certainly acts to carry off the waters from the upper Mustinka river into the main Mustinka faster than before it was constructed.

Q. And it also carries them in greater volume, doesn't it?

A. Necessarily.

Q. Then the construction of that ditch——

A. I would like to say with the exception of the time when its

banks are flooded, and then its action may be nearly or entirely nullified.

Q. In other words, if the ditch, was flowing banked full and the volume of water was such as to raise its level above the banks, the action of the ditch would be nullified, is that your testimony?

A. I said that it might be nearly or quite nullified, depending upon the depth to which it was submerged.

Q. Would it be nullified to the extent of the cross-sectional area of the water within its limits?

A. No other water could be affected other than that which it contains itself.

Q. Would it be nullified in its operation and effect as to the water within its cross-sectional area?

A. It might be.

1289 Q. Then your testimony is that a ditch that is overflowed ceases to function?

A. It may.

Q. Well, does it?

A. I might answer that by saying that a ditch constructed as this is and subject to overflow may be at the time of overflow submerged by water, the surface of which is practically or nearly level.

Q. You didn't see it in any such conditi[illegible]id you?

A. Just a moment; and when the water [illegible] level or nearly level there is consequently little or no velocity and in such a case where there is little or no velocity of the water, the ditch is carrying little or no water.

Q. And what depth above the channel of this ditch would you have to assume the water to be in order to produce this effect?

A. In this particular area at such an elevation that the surface of the water would be level.

Q. Level with what?

A. Itself, perpendicular to a line connecting it to the center of gravity of the earth.

Q. Water generally is level when if is stationary, isn't it?

A. Yes sir.

Q. What level do you asume these waters would have, and by level I mean height or depth, to produce this anomalous effect you have described?

A. I don't know.

Q. Then why do you assume it?

A. I didn't assume any particular elevation of the water surface.

Q. You just told me that this ditch, given a level of the waters where it overflowed, to a certain extent would produce a dead water condition on the surface and the ditch will cease to function, didn't you?

A. I don't know what that elevation would be expressed in feet but it would be at such an elevation—that elevation would be produced when the waters accumulated at that place couldn't find an outlet and were backing up.

Q. You are talking about that particular place, how high would that have to be?

A. I couldn't say.

1290 Q. You can't give me an idea?

A. No, sir.

Q. Did you assume that the waters reached that elevation in the conditions that we have here?

A. I hardly think they do throughout the length of the ditch, they might have in some places.

Q. Then if they didn't we can eliminate the hypothetical and highly scientific phase, and come back to the water in the ditch and the ditch still flowing?

A. Yes, sir.

Q. And in assuming that the water is in the ditch and the ditch still functioning we have got back to the proposition that it carried those waters in greater volume and with more rapidity from the east towards the west?

A. Yes, sir.

Q. If there was an inadequate outlet to that ditch at the western point, what would become of the water?

A. It would overflow the banks of the ditch and the ditch then would not carry the water.

Q. And we would have substantially a repetition of similar conditions to what we had at the upper end before the ditch was in, wouldn't we?

A. I don't know what those conditions were.

Q. Well, the conditions that I have assumed, the water would flow out and follow the level land, flow over the land, wouldn't it?

A. The water would overflow the ditch and——

Q. Where would it go, in the air?

A. It would follow the flood channels.

Q. Where are the flood channels, in the air?

A. On the ground.

Q. That is exactly what I meant. Then when the water overflowed the ditch it would flow over the ground, wouldn't it?

A. Yes, sir.

1291 Q. Following the natural depressions and the natural level of the ground and spreading out according to the volume of overflow water?

A. Yes sir.

Q. Then we would have at the outlet of the ditch a repetition of the same conditions that we had at the upper end before the ditch was constructed, wouldn't we?

A. Generally speaking.

Q Now assuming for the sake of a supposititious case we did have such a condition of overflow at the outlet of the ditch, what would be the effect of the waters spreading over surrounding lands so far as their ultimate discharge is concerned into their natural basins and channels?

A. It would naturally be increased.

Q. In other words, the water that was flowing out over the land, spreading out over great areas, would have a tendency to discharge into the natural channel faster than it would if confined?

A. I would hardly say that. You say, given these conditions first with the ditch running full and discharging and second with the ditch overflowing and the land overflowed and discharging, in the second case there would be more water than there would be in the first?

Q. No, sir, I haven't asked that question.

A. Then I misunderstood it.

Q. I have asked you to take a supposititious case where we have the water overflowed at the mouth of the ditch and running over the land following these flood channels and so on and so forth, and asked you what effect that would have on the discharge of the waters into their natural basins.

Mr. Palmer: That is objected to for the reason that if first assumes that there is no natural basin and then assumes immediately afterwards there is a natural basin.

A. I don't get the picture at all.

Mr. Boutelle:

Q. I am trying to get you off of this case and have you consider a supposititious case. I am trying to get the cobwebs out of your brain so you can understand a supposititious case.

1292 Mr. Palmer: I object to the examination of this witness as to a case apart from this case and different from this case on the ground that it is immaterial and not cross-examination.

Mr. Boutelle:

Q. Professor Bass, as I understand you, you don't understand my last question?

A. No, I don't quite get that.

Q. Assuming that at the mouth of this old ditch which we have already described as the original ditch and which you and I have been discussing in questions and answers for half an hour last past there was an inadequate outlet for the waters thereby discharging so that they overflow the land, surrounding lands, of a more or less indefinite area at or about the outlet, what would the effect be so far as the ultimate reaching of those overflow waters into the natural channels was concerned? Do you understand that?

Mr. Palmer: That is objected to as assuming a state of facts not based upon any testimony in the record.

A. What the effect of what would be on the——

Mr. Boutelle:

Q. Flowing out over the land generally—on those waters getting into their natural basins, natural channels.

A. The water would then be going to its destination through a large number of channels the other by means of a sheet over the sur-

face of the land as well as that of the ditch and under those conditions the waters would be escaping at a greater rate than they would when they followed the ditch only.

Q. I am not asking you about the waters in the ditch, I am asking you about the waters that flowed over the land?

A. Well, you asked me as to the comparative effect, did you not, in that flood stage as compared with a stage when the river was not in flood?

Q. Let me reframe my question, Professor Bass, if you can't make it. If the waters had overflowed a comparatively large area near the outlet and was seeking their ultimate discharge in natural channels, those overflow waters,—would the effect be to accelerate their flow or retard it?

A. I believe that the quantity of water escaping under those conditions would be greater.

1293 Q. Escaping from where?

A. From this flooded area.

Q. You think then that the water that had spread out over the surface of the land would find its outlets in the natural channels faster than water that was confined?

A. I wasn't talking about velocity, I was talking about the total quantity of water passing.

Q. I am talking about velocity.

A. Oh, the velocity certainly would be less in a flooded condition.

Q. And it would be very much less, wouldn't it?

A. I presume it would be very much less.

Q. And a large part of the overflowed water would be lost by evaporation, wouldn't it?

A. That would depend upon how long it stood there.

Q. And it would depend upon climatic conditions to some extent?

A. Yes sir.

Q. But, under average conditions, what I say would be true, wouldn't it?

A. In this particular place you are speaking about now?

Q. Yes, or any place.

A. Some places it might, there might be a large part lost; in some pl-ces there might be a very small part lost.

Q. Your idea, as I understand it, is that water that is spread over a comparatively wide area does not lend itself to evaporation?

A. It surely does.

Q. Well, then, Professor Bass, if we have conditions existing at the upper end of this old ditch before the ditch was constructed that in case of overflow would tend to retard the flow of the water and if after the construction of an artificial ditch and the taking of those waters to a lower point we produce conditions that have a similar effect, why do you say that we have not the element of detention of the waters?

A. I didn't say that.

Q. Then you admit we do have?

A. Whenever there is a flooding of the stream there is some detention of the water.

Q. Whenever there is a flooding or overflow of this area there is a detention of the waters?

A. Certainly.

1294 Q. And if we constructed or produced artificial conditions that minimized that, we thereby decrease the detention and increase the discharge, don't we?

A. Yes, sir.

Q. Now, the next thing that we had in the area with which we were dealing was what we have termed the cut-off ditch?

A. Yes, sir.

Q. And that, as I understand it, joined the western end of the original ditch?

A. Very nearly, yes, sir.

Q. So that they made to all su-stantial intents and purposes a continuous ditch?

A. Except as intercepted by Twelve Mile creek.

Q. Was the ditch cut right across the channel of Five Mile creek?

A. Yes, sir.

Q. Was it cut across the channel of Twelve Mile creek?

A. I don't know.

Q. You don't know whether it was or not?

A. I judge not, because the channel of Twelve Mile creek at that point is lower than the ditch so I would say that the Twelve Mile creek cuts across the channel rather than the channel across Twelve Mile creek if that means anything.

Q. So that, other than as you have stated and described, we have a continuous ditch under present conditions?

A. Yes, sir.

Q. Now, was it in this cut-off ditch that we had a bottom constructed on an incline?

A. An up-stream incline?

Q. Yes.

A. Yes, sir, the first 1,800 feet were slightly inclined.

Q. In the first 1,800 feet what was that incline?

A. .1 of a foot.

Q. For the whole distance?

A. For the whole distance.

Q. Did we get any other of these up-hill inclines on the bottom of that ditch?

A. No, sir.

1295 Q. What happened after we get beyond that 1.2 inches in 1,800 feet?

A. The next thousand feet it dropped .3.

Q. Go on.

A. The next 1,000 feet it was level; the next 1,000 feet it dropped .3; next 1,200 feet it dropped .6; the next 1,300 feet it dropped .1; the next 3,350 feet it dropped 2 feet; the next 550 feet it dropped 3 feet, the next 7,500 feet it dropped about 5.6 feet.

Q. What is the fall of the land, the natural fall of the land at that point from east towards the west?

A. For the first mile is it about level, for the first half mile it

rises a foot and then the next half mile it drops a foot, next half mile it drops another foot and then in about a quarter of a mile it drops a foot and from there on it drops rapidly.

Q. In determining the velocity of the water in that cut-off ditch, eliminating for the present any factor produced by the intersection of the currents of the Five and Twelve Mile creeks, do you tell us that the bottom of that channel is an essential factor?

A. Yes, sir.

Q. As a matter of fact, given 10 or 12 feet above the bottom of the channel, that is the depth of water, would you still say that the slight incline on the bottom had any appreciable effect on the flow?

A. You mean, as compared with a level bottom?

Q. Yes, as compared with a level bottom or a slight fall.

A. I haven't made any calculations to ascertain what difference that would make.

Q. Now, Professor Bass, let me ask you a question, isn't it true that in computing the velocity of flow in a channel, the irregularities of the bottom are not taken into account as having other than a negligible effect?

A. Depends upon how great the irregularities are.

Q. Isn't it generally true that engineers in computing the velocity of flow assume that the bottom is parallel with the slope of the waters at the top, generally speaking?

A. In cases of uniform flow it is.

1296 Q. What do you mean by uniform flow?

A. I mean where the cross-section of the channel and of its slope are uniform.

Q. I am not asking now about the friction on the side at all, I am asking you about the ordinary channel, if it is not a fact——

A. I have answered that question. You may consider that question answered, you asked me what I meant by uniform flow.

Q. Yes, but I want you to tell me whether or not good engineers in figuring the velocity of flow in a channel, do not assume that the level of the bottom is parallel to the level of the surface of the water in making their computations?

A. I made the answer that only in cases of uniform flow.

Q. That is a little obscure.

A. And I answered the question in regard to uniform flow as defining the conditions where the channel was fairly uniform and where the cross-section of the channel was fairly uniform and where the slope of the bottom, the gradient of the bottom was fairly uniform.

Q. We don't in my question know anything about the gradient of the bottom.

Mr. Palmer: That is objected to as entirely immaterial and not cross-examination.

A. How would you know, how could engineers assume that the surface of the water was parallel to the gradient of the bottom if you didn't know anything about the gradient of the bottom?

Mr. Boutelle:

Q. Don't they assume that the gradient of the bottom is parallel to the surface of the water?

A. No, sir, not always.

Q. Don't they generally and isn't that a well established and well settled method of computing velocity?

A. Or in places where you have uniform flow. For instance, in the Cape Cod canal (if I may take the liberty that Dean Shenehon did in testifying) we have the condition of a non-uniform flow with tides at each end of the canal, and the engineers in figuring that canal and the size of the section and the amount of water going through it had always a condition of non-uniform flow of water where the surface water was at no time parallel with the
1297 bottom of the canal. It is not parallel to that but it is one of the cases of non-uniform flow.

Q. What effect in your computation did you allow for tides in this particular ditch?

A. I just stated that this condition had no exact parallel to that case except to indicate it was a case of non-uniform flow where the gradient of the water was not at all places parallel to the bottom of the stream.

Q. Do you know anything about or have you any measure or diagram that would give us the level of the surface of this water in this ditch when flowing three-fourths full?

A. Do you mean three-fourths of it way from the bottom to the top?

Q. Yes.

A. At the beginning?

Q. Yes, the level of the slope of the water, surface of the water.

A. No, sir, I haven't figured it running three-fourths full in the upper part.

Q. Then as a matter of fact, in figuring your maximum capacity for this cut-off ditch you have been lacking one of the essentials that engineers ordinarily take into consideration?

A. I don't know as I understand your inference.

Q. You don't know what the level of the surface of the waters was in the ditch?

A. I stated I didn't compute the flow with the ditch running three-fourths full

Q. That isn't my question.

A. Then I misunderstood it.

Q. I asked you if you had any data as to the level of the surface of the waters in that ditch in your computations other than mere arbitrary estimates?

A. Yes, sir.

Q. Where did you get them?

A. In the direct examination I stated that I took the elevation of the water flowing through that ditch at the upper end at an elevation based on the elevation of the water assumed for the calculations [illegible] mining the capacity of the bend, that is, that is

was at 998.5 and that—I assumed that the water, gradient of the water surface in Twelve Mile creek at that time was approximately, as an average, parallel to the bottom of Twelve Mile creek, that is, it had the same drop in Twelve Mile creek from the northerly end of the bend back to the easterly end of the cut-off and that
1298 gave me an elevation of the water surface at the easterly end of the cut-off of 1,002.1, which is about one foot below the surface of the ground at that place.

Q. You have no levels of the actual surface of the water in that ditch at the time it was running full?

A. No, sir.

Q. So that in taking this essential element in determining the flowage or discharge capacity of that ditch you have been forced to rely on the estimates which you have described?

A. Yes, sir.

Q. Now, I want you to go back to the old ditch for a moment, in view of what you have already told me, and give me an approximate estimate of the relative flowage capacity of the old ditch as compared with the original channel, that is, how many times greater the old ditch would be than the original channel?

A. I haven't made any estimate of the capacity of the original channel of the upper Mustinka.

Q. You couldn't tell me then whether it would be five times or ten times that of the original channel?

A. No, sir.

Q. It might be either?

A. It might be either.

Q. Now according to your measurements the so-call- cut-off from the point of inter-section with Twelve Mile creek to the point where it runs into the main Mustinka channel on the west was what?

A. About 2½ miles.

Q. Did you make any measurement of the mileage of the original channel of the Mustinka around the bend, computing the meanders?

A. Yes sir.

Q. And what did you determine as the comparative length of that with the cut-off?

A. It is about 7 miles, between 7 and 8 miles around the bend.

Q. And did you make, in determining your comparative estimates of the discharging capacity of those two an allowance for the difference in distance?

A. Yes sir.

1299 Q. What factor did you take into consideration in that?

A. I made a profile of the cut-off and also a profile of the Mustinka river around the bend, known, as Defendant's Exhibits 31 and 42, which show the distance in each case.

Q. I asked you what factor the difference of about three times in the length of one over that of the other had in the matter of velocity in your computation.

A. I obtained the minimum velocity in the Mustinka river around the bend at approximately 1½ feet per second and the minimum velocity in the cut-off ditch at approximately 2.4 feet per second.

Q. In other words, in three times the distance you increased the velocity a little less than half, is that right?

A. At the points of minimum velocity of the respective——

Q. Are we dealing in this case with minimum velocities or maximum velocities?

A. We are dealing with—it so happens that in this case the point at which the velocity is critical happens to be the minimum in each case. I might say to clear up this question right here now that in the cut-off ditch the water enters with a very slow velocity and so continues and gradually increases towards the lower end and the condition is very much the same around the bend, that it enters with a somewhat slow velocity, enters with a medium velocity which slows up and which again increases to a higher velocity near the lower end.

Q. May I interrupt you there to ask a question? Did you ever see the water flowing into that cut-off ditch in a time of flood?

A. No, sir.

Q. When you say it enters that cut-off ditch at a very small or minimum velocity you are giving us something that you think and not that you know, are you not?

A. I am speaking of the—comparativly speaking I am comparing the velocity at the upper end of the ditch to that of the lower.

Q. Could you tell us anything about the velocity with which water would enter that cut-off ditch unless you know something about the velocity with which the old original ditch discharged?

A. In determining the velocity in the cut-off ditch I haven't paid any attention to the old ditch or to the current produced by the old ditch or of the current produced by the Twelve Mile creek.

1300 Q. And it don't make any difference whether a large volume of water was coming into that cut-off from the old ditch, flowing at a very rapid rate or not in determining the velocity in the new ditch or cut-off, in your opinion?

A. The current of the old ditch and the current of Twelve Mile creek met at that point and from the indications on the surface which I saw, the battering in of the bridge, the steel bridge at the confluence of the ditch and Twelve Mile creek and the bending over of these willows all across the flood channel at that point, it seemed certain to me that the current at that point was at right angles to the mouth of the cut-off ditch, but I don't ascribe any very great importance to the fact that the current was at right angles to the mouth of the ditch because I apprehend that the quantity of water flowing down the cut-off ditch was controlled to a very great extend by the elevation of the water surface at that point.

Q. Why is elevation the determining factor in this particular instance when you have told me heretofore that elevation was not the determining factor?

A. I don't think I stated that; if I did I said so under misapprehension. I didn't mean to say anything of that kind.

Q. Then in your opinion, in determining the discharge capacity of that cut-off ditch the volume of water coming through the old ditch and its velocity cut no figure whatsoever?

A. No, sir.

Q. And were not considered in your computation?

A. No, sir.

Q. You simply assumed from certain physical evidences which you discovered on the ground that the Twelve Mile Creek was the dominant stream and to all practical intents and purposes operated as a dam at that point?

A. Yes, sir.

Q. Then what happened to the waters that were coming down the old ditch?

A. They would flow into the waters of the Twelve Mile creek and mingle with them.

Q. How could they do that if they were dammed?

A. Water often goes over a dam?

Q. What would happen with the water that didn't go over the dam?

1301 A. This dam was made of water and the water went through the water.

Q. In checking up the question of channel capacity of the old original channel around the bend, how did you get at that?

A. I found by examining the cross-sections for a considerable length around the bend, from the point where the upper Mustinka flows into it on around the bend, that they were very similar in size, all of them being practically 1,100 square feet with the water at elevation 998 approximately. Then searching for the place where we got the flattest slope in the profile I assumed that for that section the water surface was—hydraulic gradient was no steeper than the bottom of the channel under consideration and determined the velocity in the usual way as has been mentioned here a good many times, multiplied it by the cross-section and got a value of 1,500 second feet. Further down——

Q. Pardon me, professor, not to interrupt you, I understand you got 1,800 at one place and 1,300 at another.

A. Yes, I got 1,800 at one place and 1,300 at another.

Q. And you got your 1,500 now?

A. And I got my 1,500 by assuming that there was some flooding at the lower part of the channel in the vicinity where the cut-off meets the original river again.

Q. What do you mean by the lower part, the lower part of the cut-off or the lower part of the bow of the river?

A. Both, that there was some flooding in the lower section and that there might have been some factor of back-water which would decrease the hydraulic gradient bringing it not quite parallel to the slope of the channel and therefore it might be proper to decrease that quantity. In other words, I made a correction based upon another part of the channel.

Q. You didn't limit the capacity of your channel by its smallest, the point of its smallest capacity?

A. Not the capacity of the part around the bend.

Q. Why didn't you?

A. I mean I didn't limit the discharging capacity of the river by the capacity of the Mustinka found in the lower part.

1302 Q. I don't think you understand my question, professor. Your 1,500 discharge capacity is simply assumption, isn't it, pure and simple?

A. Oh, no. It is based on these cross-sections but I might say that the reason that—what you want to get at now is why I say this 1,340 was not the maximum capacity and why it might be 1,500?

Q. Yes.

A. The reason for that is that between the place where I got the 1,800 and the 1,300 there is one overflow channel leading out of the ditch and there is also a flood channel starting a little above the point where I got these 1,340 second feet discharging capacity——

Mr. Palmer:

Q. What was—I wish you would describe that in the record.

A. Which was in the southeast quarter of Section 14.

Mr. Boutelle:

Q. Then if I understand you, professor, following the natural course of the channel you found an area where at flood levels there was an overflow and below the point of overflow a more limited discharging capacity and notwithstanding you estimated the discharge capacity of the stream by splitting the difference between your maximum and minimum, is that right?

Mr. Palmer: That is objected to as assuming something not testified to by the witness and not based upon and evidence in the record.

A. No, my line or reasoning was this, that there was a discharging capacity around the bend of 1,800 second feet with the water flowing freely and with this water surface parallel to the bottom of the stream. At a section considerably below this, as had been indicated in Section 14, in the southeast quarter of Section 14, there is another section in a flood channel, and above this point there is also an overflow channel from the river. Now, between these two conditions, that is, that there is a flood channel to take part of the water and that in a flood the stream at the lower point will when it spreads across its flood channel at that point carry more water in the same way that has been explained in our hypothetical question before than when the stream is confined to its channel, although the velocity may be somewhat less there would be more water flowing,

1303 that there was a discharging capacity of more than 1,340 second feet in the lower reach of this bend. If this discharging capacity reached above 1,340 second feet at that time there would be some flooding. That flooding might tend to produce some back-water on the upper section and reduce somewhat its carrying capacity from 1,800 odd second feet, and I assume that it might be reduced as much as to 1,500 second feet.

Q. That is exactly what I mean by my question. Now, in order to get your discharging capacity of 1,500 or 1,800 feet you had to assume a surface level of the water?

A. Yes, sir.

Q. And the slope of the water around the bend?

A. Yes, sir.

Q. And you assumed that as an average or took it at different points?

A. I assumed the elevation. I think it was, I stated 998 but I think it was a little above, it was at a point where it would go over there, 998.5, at the beginning of the section which it was on, about the east line of Section 12.

Q. Did you take the level of the banks around the bend to determine whether or no at that level the waters would overflow?

A. Yes, sir.

Q. You are sure of that?

A. Yes, sir.

Q. Do your figures or your profiles there show the level of the banks, either natural or artificial, or both natural and artificial?

A. Yes, sir.

Q. And the level of the banks according to your present testimony around that bend was sufficient to confine a flow of 1,500 second feet, was it; or, to put it the other way, to confine waters flowing at an elevation of 998?

A. Approximately 998; of course, it would be a little higher at the upper end and a little lower at the lower. Yes, sir.

Q. How near to the point of intersection of the upper part of the cut-off with the channel of the Twelve Mile creek was your first cross-section taken; it is practically two miles, isn't it?

A. Yes, sir.

1304 Q. At the point which you have indicated on Complainant's Exhibit 4 in the south line of Section 1?

A. Yes, sir.

Q. Why didn't you take cross-sections within those first two miles?

A. Because I considered that in a flood flow the Twelve Mile creek and the upper Mustinka river together, taken in connection with the fact that there was an overflow into the Rabbit river at that time, would deliver more water than its channel could carry.

Q. If it delivered more water than the channel could carry, what would happen?

A. The excess water overflowed into the Rabbit river through the culvert and the channel near-by that has been testified to.

Q. Then there is no question in your mind but that we might have overflow conditions in that area?

A. No, sir.

Q. Of greater or less dimensions according to amount of precipitation?

A. No, sir.

Q. So that, in determining your discharging capacity of the old Mustinka river around the bend you did not confine yourself to the flow of waters of Twelve Mile creek but took into consideration the waters of Five Mile creek and the waters, such as they were, coming down the original channel of the upper Mustinka?

A. Yes, sir.

Q. And all of that is pure estimate, isn't it, professor?

A. It is based on facts which have been testified to here that water did come down there and did go over into the Rabbit river and that water did exist at that elevation, at an elevation sufficient to force it over into the Rabbit river, which must have been at least a few tenths above elevation 998.

Q. Then, Professor Bass, if we have no data to enable us to determine the volume of water discharging through Twelve Mile creek beyond or north of the cut-off how are you going to determine the discharging capacity of the river around the Bend?

A. By knowing the elevation of the water surface at or near the east line of Section 12, 128, 46.

1305 Q. And when did you take that water elevation?

A. Didn't take it at all.

Q. And so far as anything that you have here to show us is concerned you are unable to state the capacity of Twelve Mile creek between the cut-off and the point where you took the first cross-section?

A. I haven't yet calculated but I could do so; I have cross-sections on it and have the profile.

Q. Do you testify and do I understand you to say that given a stage of water at 998 or thereabouts which would be sufficient to produce this flow of 1,500 second feet, that the original channel would be within its banks around that bend?

A. It would be just about the point of overflow.

Mr. Palmer:

Q. Into the Rabbit river?

A. Overflow of its banks on both sides.

Mr. Bourtelle:

Q. Would it or wouldn't it overflow its banks at that point?

A. No, not at the point where we have calculated.

Q. That isn't my question, professor; at the point of elevation of 998, which you testified is required to give you your discharging capacity of 1,500 second feet, would the water be within the banks of the original channel?

A. It would with the exception that at the point where the channel leading in from the northeast through the northeast corner of Section 12 and westerly into the Mustinka is, and at that point there would be at that time a reverse current flowing towards the northeast and thence northwesterly across the southerly portion of the section line between Sections 1 and 6 and thence on into the Rabbit river.

Q. What is the level of the land at that point where your condition of overflow would exist?

A. It is slightly over 998, I don't know within——

Q. How would water at 998 overflow it?

A. It would be just beginning to overflow. We assumed that water at 998.5 would overflow that point; I think 998.5, if I remember correctly, is the number we took.

1306 Q. Is there any point around that bend that the level of the banks was lower than 998?

A. With the exception of that point, not until you get into the peak of the bend in the southeast quarter of Section 2.

Q. And at that point what is the direction of flow?

A. Direction of flow is west, west and southwest.

Q. That isn't the point where you said it would overflow into the Rabbit river?

A. No, sir.

Q. Where was the point at which you said it would overflow into the Rabbit river?

A. In the northeast quarter of Section 12.

Q. And what was the level, or do you assume was the level of the land at that point?

A. 998.5.

Q. That is the point you were just talking about?

A. Yes, sir.

Q. You say that in determining this discharge capacity you have taken into consideration the flow from the Five Mile creek and the flow from the old original Mustinka channel?

A. Yes sir.

Q. And you have made no allowance for the effect on that flow of the construction of either the original or the cut-off ditch?

A. No, sir; that is, in a state of nature that channel had that capacity, not considering the ditches at all.

Q. Do I understand you that you are talking about the channel capacity of the river in a state of nature or at the present time?

A. Both, I don't consider that it has changed up there at all.

Q. Why do you need to go into a state of nature?

A. It doesn't make any difference.

Q. You know nothing, as I understand it, about the flow of the waters in Five Mile creek or the old Mustinka?

A. I have seen water flow in both those channels.

1307 Q. What percentage of that total of 1,500 second feet do you assume is contributed by Five Mile creek and the old Mustinka as against the water coming through Twelve Mile creek?

A. I should say they were roughly proportionate to their drainage areas.

Q. And that would be about what?

A. Well, the proportion of 203 parts for the upper Mustinka, 121 parts for Five Mile creek and 364 parts for Twelve Mile creek.

Q. Then you eleminate the effect of the ditch entirely?

A. You mean in calculating the capacity of the channel?

Q. I was asking you about the respective contributions of the water.

A. I thought you were speaking of the—under natural condition, the respective quantity of water carried by those three streams.

Q. I haven't asked you any such question or referred to anything that had any bearing on it.

A. In answer to your question I would say, in the last answer I am not considering the effect of any ditch?

Q. In other words, you assume that the Five Mile creek and the old Mustinka would carry the same proportion of water that they carried independent of the ditch construction?

A. No, I didn't say that.

Q. Then how would they contribute to this 1,500 second feet the proportion that their run-off area represented?

A. Well, I might say that in a state of nature I presume I assumed that they would contribute in accordance with their respective drainage areas, but the way they are since state dicth #19 has been put there, of course, the water from the Mustinka ditch comes down the state ditch and goes down into Twelve Mile creek, and county ditch #23, which carried water of the Five Mile creek across to Twelve Mile creek, and the way conditions are now a large part of the waters of Five Mile creek in a flood go across to Twelve Mile creek, and go north, while the original channel being there, some of it still keeps on in the channel of Five Mile creek the same as before, and in the upper Mustinka a large part of the water comes down state ditch #19, some of it keeps in the old channel, and in this way when they get down into 18 and 17 and 7, as has been testified, overflow,
1308 and this water all goes down into the northeast quarter of Section 12.

Q. This is all assumption, isn't it?

A. No, sir, it is common sense.

Q. That is your opinion?

A. I know it is so because I have been on the ground and the ground slopes in that direction and the streams are there and they have been eroded by water I suppose, unless the wind has been blowing pretty hard, but there has been testimony here to show that that has been the case.

Q. You assumed in your answer to the last question that the waters that were brought in by the original Mustinka ditch are diverted and carried around the old channel?

A. To some extent.

Q. And you are unable to state from any personal investigation or observation what contribu*t*ation would be made to the aggregate waters by either Five Mile creek or the upper Mustinka?

A. I haven't made any measurements of these streams.

Q. So that the estimate of discharging capacity of the old Mustinka around the bend is based simply upon the estimates which you have alread- described?

A. I have stated before that it is based on the map which we have made here and also upon the testimony which has been given, indicating that water in flood times flowed over into the Rabbit river and in order to flow into the Rabbit river it had to get up to elevation 998.5 or thereabouts, and that forms the basis for determining the el-vation of the water surface and the calculations in regard to flow in that channel.

Q. Your estimate of the discharging capacity of the cut-off was 1000 second feet?

A. Yes, sir.

Q. And what velocity of flow did you assume in reaching that conclusion?

A. I didn't assume the velocity; to start with I assumed an elevation of the water surface at the upper end of the ditch.

Q. And what did you assume?

A. 1002.1.

Q. And your average cross-sectional area?

A. Approximately 400 square feet.

1309 Q. And your velocity?

A. About 2.4 feet per second.

Q. Now, Professor Bass, the opinion that you have expressed here as to the effect of these ditches on the discharging waters of this area all comes back necessarily in its last analysis to the correctness of these two computations, doesn't it? That is, the assumption that the original channel around the bend was carrying 1500 second feet and that the cut-off ditch only carried 1000?

A. I don't know whether the water was divided in those proportions during the floods or not.

Q. Well, if those computations are incorrect, what becomes of the theory you have expressed in this case?

A. That does not imply they are incorrect. I might be if this cut-off ditch were here, suppose that cut-off ditch had not been constructed or if it were blocked at the present time, what I say is that in a flood that channel would have a carrying capacity of 1500 second feet.

Q. If your theory of the diversion of waters through the Twelve Mile creek and the practical damming of the cut-off ditch thereby is erroneous and if the cut-off ditch channel carries instead of 1000 feet in the vicinity of 2500 feet, your theory falls, doesn't it?

A. No, sir; you mean if it has a carrying capacity?

Q. No, sir, if it carries 2500.

A. If it carried 2500?

Q. Yes, your theory falls, don't it?

A. If the cut-off channel carried 2500 second feet for a short length of time it does not; if it carried 2500 feet long enough my theory in regard to the rise of Lake Traverse attributed to the construction of this ditch necessarily falls.

Q. And if your theory in regard to the amount of water carried by the cut-off ditch in the amount which I have last stated of 2500 second feet or ther-abouts continued for ten days you could not justify the figures you have given us with respect to the effect of the elevation of Lake Traverse, could you?

A. No, sir.

1310 Q. And the result would be under the circumstances that I have last stated that we have waters carried into Lake Traverse very materially adding to its elevation, that wouldn't have come in in a state of nature, that is true?

A. If they came in at that rate.

Q. If they came in at that rate, or thereabouts?

A. Yes, sir.

Q. That is true?

A. That is true.

Q. You have no reading in regard to the discharge of the outlet of this rectified Mustinka river except those which you have given?

A. No, sir.

Q. And you testified, as I understood you that based upon the figures, the computation that you had made in 1917, the discharge was about 1900 second feet?

A. The maximum discharge?

Q. I think that was what you said?

A. No, the maximum discharge on any one day recorded in 1917 was 2230, according to the figures that I have.

Q. Well, where did you get—you gave 1900 for something, I want to find out what that was.

A. That was the next day afterwards, that was 1962 second feet.

Q. Didn't I understand you to state that you estimated that as a four-day average?

A. I will have to figure that again. Yes, that is about 1900 second feet per day for four days.

Q. If I understand you correctly you stated of that 1900 second feet, 400 second feet or thereabouts would be overflow?

A. What I stated was, what I mean to say is, that of that 1900 second feet, 400 second feet of it—if all of this water had to go around the bend, 400 second feet of it would have to come in some other way than by running in the old channel of the Mustinka around the bend.

Q. And you also told us, if I recall your testimony correctly, that based on those figures and taking into consideration the increased precipitation of from 25 to 30 per cent of the years 1915 and 1916 you assumed an increased discharge of 50 per cent?

1311 A. Yes, sir.

Q. And you gave me that total as 2100 second feet?

A. As the average flow for four days, for the four maximum days, of 1916.

Q. What did you take that 50 per cent of, to get that total?

A. That the e-cess run-off might be 50 per cent.

Q. What do you mean by the excess run-off?

A. I mean that this 1900 second feet might under such circumstances amount to 2100 second feet.

Q. Then what percentage would that be?

A. You mean of the whole year? That would be about 110 per cent.

Q. The increased precipitation from 1900 to 2100 would be an increase of 110 per cent?

A. Increase of 11 per cent.

Q. You stated if I undefstood you correctly on direct examination that in view of this remarkable precipitation that we had, you increased it 50 per cent. Why do you make your figures on the basis of 11?

A. I said it would increase the excess 50 per cent.

Q. What would it increase the total discharge?

A. I estimated it 10 per cent or it amounts to about 11 per cent. It might be more than that, it might be less, I don't know.

Q. Professor Bass, at 998, which you have assumed as the level to bring about your 1500 second feet around the bend, what would the condition of the waters be in Five Mile creek and the upper Mustinka as to overflow?

A. I think they would be—the lower two or three miles would be overflowed.

Q. In what we have termed here the delta zone?

A. Yes, sir.

Redirect examination.

By Mr. Palmer:

Q. As I understand it, Professor Bass, your computation of the carrying capacity of this old Mustinka channel around the
1312 bend was based upon the assumption that the new cut-off ditch was not in existence?

A. It was based on the evidence submitted that the water overflowed into Rabbit river and our map shows that in order that the water might overflow into the Rabbit river it must reach at the southeast corner of Section 1, it must reach an elevation of slightly above 998, so that the fact that it did overflow to Rabbit river to my mind proves that the water did reach the elevation of 998.5 and that formed the basis of the calculation.

Q. And that it reaches that under present conditions the same as it did in a state of nature?

A. Testimony has been that it had done that both times.

Q. I understood you to say that you considered this carrying capacity just as though this new cut-off ditch was either non-existent or not operative?

A. Yes, sir.

Q. In a state of nature Five Mile creek had its outlet into the old Mustinka river in the western portion of Section 8?

A. Yes, sir.

Q. As shown on this map, Exhibit 4?

A. Yes, sir.

Q. After that confluence, and about a mile westwardly therefrom, the upper Mustinka augmented by the waters of the Five Mile creek flowed into the Twelve Mile creek?

A. Yes, sir.

Q. And is that why, in making your computation of the carrying capacity of this old channel around the bend, you made all of your calculations upon cross-sections of that channel below the point of influx of both those streams?

A. That is one of the reasons, yes, sir.

Q. Under present conditions you state that the waters of Five Mile creek reach Twelve Mile creek through county ditch #23?

A. To a large extent.

Q. And some, I presume, through the old channel of Five Mile creek?

A. Yes, sir.

Q. And that the waters of the upper Mustinka reach the
1313 Twelve Mile creek either through the first section of the Mustinka ditch the old section, or through the former channel of the upper Mustinka?

A. Yes, sir.

Q. So that the same waters reach the point where you took the first cross-section of the old channel in making your computations just the same as they did in a state of nature?

A. Yes, sir.

Q. Now, at 998.5 water surface elevation at the point where you took the first cross-section on the south line of the southeast quarter of Section 1, you say the water doubtless overflowed both banks?

A. After they got above about 998.5, within a tenth or two they begin to overflow both banks.

Q. And the waters that overflow the north banks go where?

A. Rabbit river.

Q. And the waters that overflowed the south bank?

A. Rejoin the Mustinka at a lower point in the bend in Section 11 and 14, and then follow down the old channel or else the overflow channel or the flood channel, the stream itself.

Q. Into Lake Traverse?

A. Into Lake Traverse.

Q. Now Professor Bass, if it were true that this new cut-off carried 2,500 second feet for ten days or any other time, it would be certain to show in these gaugings of the stream below, wouldn't it?

A. It would if it—if the gaugings were taken at that time.

Q. And as I understand it, from the actual gaugings taken in the spring of 1917, you have allowed for the increased precipitation in the spring of 1916 in figuring the amount of excess waters which may have reached the point of the gaugings through a medium other than the old channel around the bend?

A. Yes, sir.

Q. You stated that at an elevation of the water surface at the point of making your first cross-section of the old channel at the south line of the southeast quarter of Section 1, you assumed the elevation of the water at the entrance of the cut-off at 1002?

1314 A. Approximately.

Q. Why?

A. By considering that the slope of the water surface from that point back up to the cut-off ditch is approximately the same as that of the slope of the bottom of the Twelve Mile creek through which it comes. In fact, I assumed it with a slope there a little steeper than that.

Q. And at an elevation of 1002 at the entrance of the cut-off ditch you say the water surface would be within one foot of the surface of the ground?

A. Yes, sir.

Q. Why do you not take into consideration the velocity of the

flow in the old section of the ditch at its entrance of Twelve Mile creek?

A. The motion of water is caused by two elements, one of which is called the static head and the other the velocity head. The velocity head is generally unimportant and I considered that it had in this case relative little influence. In other words, the water stands at a certain level at the intersection of Twelve Mile creek and the ditch and it goes both directions. Some of it goes down Twelve Mile creek and some of it goes down the cut-off ditch from the same elevation. There is a considerable current in Twelve Mile creek, there is a considerable current down that ditch probably at the same time and they mingle and the result is that the water is thrown neither directly into one channel nor the other, but the marks on the ground indicate that the weight of the current is thrown to the north.

Q. That is, by the conditions you have spoken of at the bridge just north of the cut-off?

A. Yes, sir.

Q. You have been asked as to the action of this first section of the Mustinka State ditch, which is marked here on Exhibit 4 as state ditch #19, when there was an overflow condition along its banks, and you have stated that is was perhaps not actively working at that time. Which way would the overflow waters move along the line of the old state ditch, section of the state ditch?

A. Generally to the northwest.

1315 Q. And what would be nearly at right angles with the direction of the flow in the ditch?

A. It is about an angle of 45 degrees.

Q. Would that make a difference in retarding the operation of the ditch?

A. I can't say that that in itself would have any significance.

Q. Now, in the supposititious case about which counsel asked you, given a ditch, we will say, one mile in length and with an incline against the natural current of one foot and a head at the entrance of the ditch of 6 feet of water, what would be the effect of the filling up of that wedge, as described in the question, in the bottom of the ditch?

A. Probably be to decrease the amount of water flowing to some extent.

Q. Why?

A. The cross-section in the upper part would be decreased.

Q. By one foot in depth, wouldn't it?

A. In other words, the opening into the ditch would be smaller than it was before.

Q. And if you continued to raise that end of the ditch you would continue to lower the area of flow into the ditch?

A. It would continue to decrease it.

Q. Yes, to decrease the amount of water flowing. You were asked whether you were able to fix arbitrary limits to the area of overflow in and about this area described by you as the Redpath sloughs. What do you understand by the word arbitrary in that question?

A. I understand that to mean limits which would be fixed without any particular reason being ascribed.

Q. Are you able to fix and were you able to fix there upon the ground definite, reasonable limits of the area overflowed?

A. I think that the testimony has been given as regards actual limits of overflow in this area but personally I would judge from the appearance of the ground that the area is close to the Mustinka river and between the lower part of Five Mile creek and the lower part of the upper Mustinka, especially in Section 17, 21, 23 and perhaps a part of Section 27 and Section 7 would be particularly sub-
1316 ject to overflow and in fact the land in that vicinity seemed to be either uncultivated or else hay land whereas in all the rest of that land described in the testimony it was farms and agricultural land. That is the only evidence I have of it, the only reason I have for putting any limitation on the area of overflow other than of the general slope of the ground. Of course, there is some overflow to the north from the upper Mustinka river through the various flood channels, and I take it from that in time of extreme flood now as well as before the construction of the upper ditch that these channels are full of water and overflow, that these sections for a mile or two north or the Mustinka river in Traverse county are temporary overflowed.

Q. Where does that water go?

A. Into the Rabbit river.

Recross-examination.

By Mr. Boutelle:

Q. In answer to counsel's questions you stated that where the ditch was overflowed the water would go generally north; did you mean that the waters that overflowed the ditch to the south would run north?

A. This section here? Yes, they would run first to the west and then to the north.

Q. While they were overflowing they would run south, depending on the amount of water that was pushing them from behind?

A. Yes, sir.

Q. Just one question more. You have told us something about your estimate in a state of nature, saying that the maximum discharging capacity of the Mustinka river around the bend was approximately 1,500 second feet?

A. Yes, sir.

Q. 1,500 second feet then would represent the maximum discharge at the outlet, wouldn't it?

A. At the outlet of the river?

Q. Yes, substantially?

A. It would unless there was such a flood coming down that the banks of the river at the bend were overflowed when a greater quantity might go around that way.

1317 Q. Well, that is a rather negligible factor, isn't it?

A. I don't think it is, I think it is quite an important factor because the flood channels eroded there on the lower side of this peninsula, or the western side, indicate that that condition had taken place at times.

Q. You don't claim that those waters would be transferred into Lake Traverse with the same rapidity that the water in the channel would?

A. No, sir.

Q. And they would, flowing over the land, be subject to evaporation?

A. Yes, sir.

Q. And many other conditions that would retard their flow and decrease the amount that would ultimately get into the lake?

A. I think the amount that would ultimately get into the lake would be pract-cally the same.

Q. But you couldn't give us any estimate as to quantity that would compare with the channel discharge?

A. I have been basing my figures as to the quantity of water going to Lake Traverse on these gaugings of the United States Geological Survey.

Q. Well, Professor Bass, where is this water coming from that we are supposing is going to come down the Mustinka into Lake Traverse?

A. Coming from further up-stream.

Q. If there were conditions of overflow further up-stream that water would be very seriously retarded, wouldn't it?

A. It would be retarded in proportion to the amount of overflow.

Q. So that from a practical standpoint, without undertaking to be exact, the discharge at the outlet would be in round figures somewheres around 1,500 second feet?

A. I couldn't say how much it would be.

Q. You don't assume for any purpose in a state of nature additional waters were manufactured for this case?

A. No, I assume that the channel when flowing within its banks would carry that water.

Q. And that is practically what we are dealing with so far
1318 as the discharge into Lake Traverse is concerned in relatively short periods of time?

A. No, sir. I don't think so. I think in relatively short periods of time that the existence of these flood channels show and the testimony of these people in this vicinity as to the water flowing across this peninsula indicate that more water escaped from up around the confluence where the flooded conditions obtained than this channel would carry, so that more than 1,500 second feet, in fact, I think as a matter of fact in these spring floods that practically no water ever went through this cut-off ditch.

Q. I am not talking about the cut-off ditch.

A. I think where we had the 2,300 second feet I think it is more than likely that—I can't say for sure, but here are people who testified that during the crest of this flood and for several days before

this cut-off ditch was carrying no water because it was full of ice and snow, consequently all of that water must have gone around there.

Q. You don't take any stock in that proposition about the ditch being full of ice and snow, do you?

A. I have to believe——

Q. From you- own observation?

A. I didn't see it but I have to believe the testimony that is given of course.

Q. From the lay of that ditch, east and west, and the place of the sun during the spring months, which would the sun have the best look in at, the east and west ditch or the north and south channel?

A. North and south channel.

Q. Coming back to my question, the discharge from this Mustinka watershed, eliminating these overflow waters, would be largely measured by the capacity of the river?

A. Yes, sir.

Q. And in a state of nature, not talking about the water that was brought down by those artificial conditions, 1,500 second feet discharge or thereabouts would not produce a flood condition, would it, of any perceptible duration in the Bois de Sioux valley?

A. It would produce a flood within two inches as great as the one that actually did occur——

1319 Q. It would, and that is why——

A. — based on these records of the United States Geological Survey.

Q. And that is why we never in the history of this region, so far as testified by the witnesses, have never had such a flood while natural conditions obtained?

Mr. Palmer: That is objected to as not based upon any state of facts testified to in this case.

A. I think we have had such a flood because there are records to show that the lake has been at just as great a height before as it did in 1916.

Q. Do you pretent, professor, to state that there ever has been such a flood in this region before as existed in 1915 and 1916?

A. I believe there has.

Q. But you have no knowledge of any such fact? I am speaking of the time of Lake Agassiz.

A. No, I understand that evidence is to be introduced here which would be the same as the information which I have obtained. I don't know whether you want to admit that in a question at this time.

Q. You can leave your answer that way, you base that on information you obtained on the outside, is that right?

A. Yes, sir.

Redirect examination.

By Mr. Palmer:

Q. When was it?

A. That in 1881 the water reached the same elevation that it reached in 1916 and there was a definite mark established on the shore, the elevation of which we took by levels and found that it was 976.6.

Mr. Boutelle:

Q. How long did it last?

A. I don't know.

(At this time recess was taken until 10 o'clock, a. m., October 5, 1917.)

1320 October 2, 1917, 4 p. m.

FREDERICK WILLIAM SARDESON, being duly sworn in behalf of defendant, testified as follows.

Examined by Mr. Palmer:

Q. Where do you live?

A. Minneapolis, Minnesota.

Q. How long have you lived there?

A. Since 1886.

Q. What is your age?

A. 51 years.

Q. What is your profession?

A. Geologist.

Q. Are you a graduate of any college?

A. Graduate of the University of Minnesota, in 1891, Bachelor of Literature, 1892, Master of Science, in the University of Freiburg, Breisgau, Germany, Ph. D. in 1895.

Q. Ph. D. from what institute?

A. University of Freiburg, Baden, Germany, 1895.

Q. Have you been an instructor in the subject of geology since your education was completed?

A. I was a member of the arts faculty of University of Minnesota for 16 years and of the engineering faculty for part of that time.

Q. With what title, Professor Sardeson?

A. Title of instructor and assistant professor.

Q. And what was this 16 years, what period?

A. It ended in August 1st, 1914.

Q. And what had been your principal business since you left the work in the University?

A. I have continued as professional geologist, having had that privilege during the entire time of my service as instructor and assistant professor in the University.

Q. How long then would you say that you have been a practising geologist?

1321 A. I did work for the United States Geological Survey the first time in 1899 and have been in the field practically ever- field season since that time.

Q. And are you still connected with the United States Geological Survey?

A. In 1911 I accepted a commission as geologist #67 of the United States Geological Survey on per diem basis. Since December, 1915, I have been on leave of absence from the United States Geological Survey and have been working in the State of Minnesota on the problem of reclamation and drainage.

Q. And have you had in connection with your profession as a geologist occasion to make a study of drainage and reclamation of lands, particularly in the State of Minnesota?

A. Yes, sir.

Q. Have you been in the employ of other institutions than the United States Geological Survey and the University of Minnesota?

A. Yes, sir, I have worked for municipalities, the City of New Ulm, and other problems in Minnesota at different times, and from 1911 until 1915 I was working on a geological land classification involving a detailed study of the glacial geology and pre-glacial and post-glacial drainage in Minnesota in a working co-operation between the United States Geological Survey and the University of Minnesota. I was geologist for the Great Western railway in 1896 and 1897.

Q. In your service with the United States Geological Survey did you have occasion to do some work upon the lands that are material in this case?

A. In 1912 I worked up a quadrangle and folio, Herman-Morris Folio, which covers the Herman, Parret, Morris and Chokio quadrangles. The Herman and Chokio quadrangles lie in this area, studied the ground in detail, taking a record of every well in the area and viewing all of the land so as to map it in detail. At that time I made a short excursion into the Tintah slough district but didn't go in detail over other parts of the area to the west of the Herman and Chokio quadrangles.

Q. This Tintah slough district is in the township of Tintah in Traverse county that has been referred to here?

A. Yes, sir.

1322 Q. Have you recently made an examination and study of the drainage area tributary to Lake Traverse and the Bois de Sioux river?

A. On September 3 to 6 inclusive of this year, I went over the greater part of the Mustinka basin which I had not seen before and also the Rabbit creek basin in part, and the district lying in the Dakotas on the west of the Bois de Sioux and Lake Traverse. I was then in the employ of the attorney general of Minnesota.

Q. Have you made a study of this area through reading, also?

A. Yes, sir, I have read all of the literature pertaining to the glacial Lake Agassiz and the outlet of that lake, known as the river Warren and all that had been written and a very large amount of manu-

script that had not yet been published regarding glaciation and glacial geology of the entire state of Minnesota and parts of Dakota.

Q. Will you give, Professor Sardeson, a very brief statement of the history of this glacial lake Agassiz, in so f[illegible]s it is material to the area in question here?

A. During the last glacial invasion, a glacier of lobe of ice came down from Canada with the Red river basin as its axis and pushed southward as far as Des Moines, Iowa. As the glacier melted away from the front causing its border to retreat it finally crossed the divide which runs through Donnelly and Browns Valley and as it came north of this divide the basin between the ice barrier on the north and the heighth of land on the south filled with water which was then a lake known as Lake Agassiz. As the ice progressively melted away northward, moving the front of the glacier northward the lake increased in size and also in volume of water, much of which came from the westward and eastward as far as the present Lake Vermillion in Minnesota and flowed in an outlet which made a channel or canyon. This channel or canyon is the valley in which Lake Traverse, Big Stone lake and the Minnesota river valley now lies and a branch of the valley forms the Cottonwood sloughs canyon, in Roberts county, South Dakota. After the ice melted backward far enough so that an outlet drew off the waters of Lake Agassiz to the north, this River Warren valley was occupied by the Mustinka and the Little Minnesota and waters from other tributaries of the Minnesota river. Very gradually the Little Minnesota built a delta across the valley forming what is
1323 now known as Browns Valley and dammed up the waters to and back of the delta of the Mustinka river until they ofer-flowed northward in the vicinity of White Rock and again at the mouth of the Rabbit river. At that stage there was a lake from the mouth of the Rabbit river to Browns Valley. This lake is now gradually draining out by the cutting down of the outlet called the Bois de Sioux northward. The lake was originall- broad and fairly uniform but with the lowering of its surface has become swampy and divided at the north end. The Mustinka river has built a delta out into the lake, this delta consisting of fine sand and mud, out to the interstate bridge and the channel connecting the upper Lake Traverse and the lower parts known as Mud Lake and Clubhouse lake. On the west side of the valley a similar but somewhat higher delta has been built by drainage coming from the direction of the Cottonwood sloughs, forming the western division between Mud lake and Clubhouse lake. There are a number of deltas, in fact, probably a continuous series of them from opposite White Rock on the west down to the delta formed by the Jim creek which comes out of the Cottonwood canyon near the upper end of Lake Traverse.

Q. What forms those deltas?

A. The working of gulches and ravine by intermittent streams coming off from the higher land on the Dakota side of the lake and the deposit of the material along the slope in fan or delta form at the border of the lake.

Q. I wish you would describe more in detail the part of Lake Traverse southerly of the Mustinka river outlet.

A. It is an open permanent lake with a few comparatively small islands, has relatively high shores, and being the bed of an old river, the glacial river Warren, it is comparatively uniform in depth.

Q. What is the nature of these islands?

A. They are stone or resistant spots in the bottom of the old river Warren which were left by the current as prominences and were probably islands in the River Warren at its final stage.

Q. Now, the shelves of land around the lake before reach-
1324 ing the high banks on either side have been described by Professor Bass quite accurately, have they?

A. There was a narrow terrace left on the west side of the lake by the action of the glacial river at the mouth of Jim Creek and northwood to the elevator at Diamond, ten miles. On top of that terrace are fans full of sandy material carried from a succession of ravines along the bluff but northward from Diamond the fans extend without any previous terrance and slope from the edge of the marsh or from the lake back to the foot of the bluff. The border between the original bed of the river and of the lake is easily distinguished by the boulders which are strewn over the original bed of the river and which do not appear at all in the fans and deltas; that is, the fans and deltas are without boulders.

Q. I wish you would describe more in detail the bed of this ancient river which is now, as you say, the bed of Lake Traverse.

A. The whole valley was made by erosion. The river was very wide and strong, occupying the entire width of the valley as a single current.

Q. From what points?

A. From above Fairmount down to Brown's Valley and on down the Minnesota river, so that the original bed is comparatively uniform. I mean, there was no meanderings of a stream but the sweeping effect of a single broad, strong current. As the valley was cut down, in addition to a comparatively smooth bottom there was left a concentrate of boulders, the heavy pieces in the glacial drift that originally belonged in the land that was carried away. Under the lake there is a boulder-strewn surface, and where the land is high enough towards the north to appear above the level of the lake and its parts, the land was originally and very largely is yet heavily strewn with boulders. It is a stony piece of land. This stoniness is about in the same proportion as the height of the bluff on the right and left of the valley. As the bluff recedes northwards on the right and left the boulder-strewn pavement becomes less dense until near Fairmount it was scarcely more bouldery in its original condition than is the land on the bluffs to the right and left.

Q. And what condition then indicated to you that this land in the Bois de Sioux river, in Lake Traverse and on up to Fairmount,
was part of the lake bed?

1325 A. The land has a loamy soil which is different from the soil that is derived directly from glacial drift and indicates that it was formed by the action of water subsequent to the time that the valley was made. I mean even where the boulders protrude at the surface there is around them a deposit of silty, rich

soil that was not there at the time when the river eroded the valley because it would then have been carried away as loose material, but has been deposited by some other action of water and there is nothing else to which I could assign the origin of such a silty deposit except that the lake covered the land and brought the material there in that way.

Q. And the presence of boulders, how far to the north and how extensive through this Bois de Sioux valley did you observe those?

A. They can be said to be numerous as far south as Blackmer, and then from there towards Fairmount they have either been very largely cleared away or in places where they have not and in sloughs and in the bed of the Bois de Sioux itself they are scattered and few.

Q. How far to the northward did this actual water surface occupied by the river extend?

A. The Lake Agassiz was to the north and the water came out of the lake past Fairmount and southward through the valley past Brown's Valley.

Q. Until?

A. Until the lake disappeared and then there was left a wide valley with the Mustinka——

Q. Until Lake Agassiz disappeared?

A. Until Lake Agassiz disappeared and then the valley was occupied by the Mustinka and other small tributaries flowing southward from a point as far north as White Rock, at least, and there was then quite evidently a ponded condition to the mouth of the Rabbit river with the drainage going northward past the mouth of the Rabbit river.

Q. The lands in Traverse county as well as those to the southward in Big Stone county and northward in the eastern portion of Grant county and a small corner of Stevens county and extending northward into Wilkin county have been described as level prairie lands; have you examined them?

1326 A. Yes, sir.

Q. I wish you would briefly describe them and tell what, if anything, was the effect upon these lands of this glacial Lake Agassiz of which you speak.

A. The glacial Lake Agassiz at its highest elevation reached to 1,080 feet above sea level and all of the land lying at the lower level within the basin northward of the shore of the lake is smooth. As the glacier was retreating the materials from the ice were water-laid, making a smuch smoother topography than obtains where the glacier in melting dropped the contained materials on to the surface. One can see it at a glance that the Lake Agassiz basin has been at some time a submerged surface. The smoothness of it expresses that to every thoughtful person. Outside of the 1,080 foot contour line to the south and to the east there is a smooth till plane with numerous small kettles usually shallow and some deeper basins occupied by sloughs and lakes and only in a small part of the area, about a mile or two miles wide on the east side of the Mustinka river there is what would be called distinctly terminal moraine. It should be un-

derstood, however, that till planes are sometimes called ground moraine. The entire region is a rather smooth one as compared to other parts of the State of Minnesota.

Q. This contour of 1,080 is that what is known as one of the beaches of the lake?

A. No, the Milnor beach in Dakota is at 1,080 but the Herman beach is at a little lower level, the first beach in Minnesota.

Q. Name these beaches and tell what places they pass through where they get their names, so far as they are material here.

A. There is, the highest beach on the Dakota side corresponding to an unmarked shore line on the Minnesota side of 1,080 feet above sea level, it is called Milnor beach because it passes through Milnor and it passes from a point on the bluff west of White Rock and runs northwesterly. The next lower beach is the Herman beach, a ridge from 5 to 15 feet high, consisting of sand and gravel, which is identified near Herman, known familiarly as the Ridge, and that runs through the village of Collis in Tarrah township, Traverse county, and thence northwesterly in direction across Lake Traverse to a little north of White Rock and thence northwesterly.

The Norcross beach is recognized at Norcross as a gravelly
1327 beach but in other places it is mostly sandy and it is interrupted, it is not a continuous beach, it extends from Norcross in a curve about two miles north of Dumont and converges to near the Herman Beach west of White Rock and runs parallel to it northwesterly. The Tintah beach is near Tintah and runs to Wheaton, also a part of it curves north of Wheaton on the high land, Sections 26 and 35 and neighboring parts—that is the town of West Monson—and it also extends into North Dakota parallel to the Herman and Norcross beaches at a little lower level. The Campbell beach runs from near Campbell to a point nearly between White Rock and Fairmount and then correspondingly on the west side of the valley. These beaches are gravelly and sandy and absorb rainfall very quickly and well water can be obtained by digging to the bottom of the beach. There is a little ponded water under them nearly everywhere.

Q. They are then to be reckoned with in the study of the drainage of this area?

A. Yes, have some effect in retaining surface water.

Q. What is the width of these benches?

A. They are generally from 1 to 6 or 10 rods wide. Associated with the beaches are sand bars which at Norcross cover several number of square miles and the same would probably be the case on the North Dakota side.

Q. Did you make an examination and study of this area that is indicated by the light blue shading on the map, Complainant's Exhibit 1 and has been designated here as the delta zone?

A. Yes, sir.

Q. How thorough a study did you make of it?

A. Those parts which lie in Grant and Stevens county I had examined in detail so that my eye had passed over every acre of it.

In the parts in Traverse county I went across it from east to west and from north to south.

Q. Describe it as you found it.

A. Well, in the first place, I didn't find it. There is no such geological or geographical unit there.

Q. Was there ever any such?

A. There never has been any geological or geographical unit or boundaries correspond- either accurately or approximately with the area marked in blue on the map.

1328 Q. What did you find there on that area?

A. I found a smooth, gently sloping surface with a new drainage system.

Q. Occupied?

A. Occupied by several streams practically the same as we find in most level parts of the State of Minnesota.

Q. As to its settlement and cultivation?

A. It was settled and cultivated, the same as Grant and Stevens county generally.

Q. And the other parts of Traverse county?

A. And the other parts of Traverse county so far as I have seen them.

Q. About the natural drainage of this area, called the delta zone?

A. The so-called delta zone is of a smooth surface, which is very easily drained, both naturally and artificially; there are such slight prominences and such slight depressions. When it looks very wet but——

Mr. Boutelle:

Q. Are you testifying to something you have seen or something that is based on information?

A. No, I am testifying to what I have seen.

Q. Did you see it wet?

A. Yes, sir, I was in a heavy hail storm, up in that district.

Q. When?

A. In 1912.

Mr. Palmer:

Q. Go ahead.

A. In 1912, this was a dry year so that I saw it wet only after occasional storms and naturally went to see the effect of those storms purposely. The principle of drainage, for instance, is this: A gallon of water on a level floor make- a large sheet of water, very broad; while a gallon of water on a rough surface does not look like very much water. On this level area, especially that which lies within the boundaries of old Lake Agassiz, a heavy rainstorm at once gives the appearance of inundation to the surface, but the surface being smooth the run-off is easy and the land is soon dry. I was particularly studying the liability of those lands to drouth.

1329 Q. It has been testified here by Dean Shenehon that those

lands in that so-called delta zone must have been subject to very frequent submergence; what would you say about that?

A. Well, some 30 or 40,000 years ago that was undoubtedly true but in historical times it has been a comparatively well-drained glacial surface and lake bed.

Q. Naturally well-drained?

A. Naturally well-drained, yes, sir.

Q. How does this so-called delta zone compare geologically and geographically and topographically with the other surrounding lands in Traverse county and in Big Stone county and Wilkin county and eastern Grant county?

A. As a lake basin surface, glacial Lake Agassiz surface, it is smoother, has fewer pot-holes and depressions and sloughs and practically no lakes as compared with the area above the 1080 foot contour line, the ordinary till plane, where above the 1080 contour line beyond the domain of Lake Agassiz there are very numerous shallow kettles, a rod to 10 rods wide, and sloughs, which in wet weather are wet and in dry weather are dry, besides lake basins. Under the Lake Agassiz basin the corresponding depressions are less numerous, very shallow, very wide and comparatively easily drained out naturally.

Q. I wish you would speak a little more definitely in comparing these lands in this so-called delta zone with the other lands around it, immediately around it, below the 1080 contour line.

Q. I don't recognize any difference because the boundary put upon the map is entirely artificial.

Q. Put upon the map, Exhibit 1?

A. Exhibit 1, it is entirely artificial.

Q. It has been spoken of here that the delta zone is a detaining basin in which water accumulates, Professor Sardeson. What have you to say about that?

A. There is no basin or detaining portion of it that I have seen excepting the Redpath *slough/s* and the so-called Tintah slough. In the Redpath slough there is about 3½ square miles, that has been an area receiving deposit from the surrounding streams instead of being washed off by the rains. Those 3½ square miles could be spoken of as delta, that is, it is a filled-up lake; the deposit of
1330 filling is from 6 feet to 1 foot in depth. It is very distinc-ly recognizable. In the Tintah slough *was*, on the other hand, it is an erosional surface; the word slough, was never properly applied to it, the sod and grass rests immediately upon the boulders and pebbles and cobbles of the glacial drift. I found no deposit in the parts of it which I visited in zigzagging across it excepting some limited areas of bog deposit which appeared to have been made up of sod rather than the bottom *or* the land. It is wet land, growth on wet land. The cause of the wetness of the land I was not able to determine. It may be that there is spring water issuing in small quantities at that point.

Q. In the Tintah slough?

A. On the side of the Tintah slough. Outside of the Redpath slough I found everywhere the evidences of erosion on the surface

and nowhere evidences of deposition in any area that would be mapable.

Q. Is it proper then, Professor Sardeson, to apply the term delta zone to any part of this area that has been mapped here and designated as the delta zone?

A. Not geologically or geographically.

Q. Why?

A. Because there is no delta deposit upon it outside of the 3½ square miles of the Redpath slough. It is distinctly an erosional surface which a delta is not.

Q. What is the geological formation of the soil through this area, particularly this delta zone?

A. The glacial till or drift is broken up by frost to a depth of 5 or 6 feet, making a brown, somewhat loosened subsoil, and upon that is from 6 inches to 2 feet of black soil, consisting, of course, of subsoil mixed with decomposed plant and animal remains and organic materials.

Q. And what is the soil there?

A. Clay.

Q. What kind of clay?

A. Heavy clay, practically all of it, excepting in the Redpath slough and on possibly a few smaller swampy tracts where there is an accumulation either of this filling of sand or of humus, vegetable material.

1331 Q. Did you make any examination of the wells in that vicinity of this so-called delta zone area, particularly as to the presence of absence of artesian wells?

A. That part which extends into Grant county I took the well record for every well if I could obtain it and there are flowing wells in part of that district and all of the wells are artesian, that is, water when struck rises well up towards the surface, a few of them overflowing.

Q. What does that indicate?

A. That indicates sources of water supply coming from the northeast under head and indicates that the underground waters are moving from northeast or easterly direction to the west and any effort to drain the surface of the land by turning water underground would meet with defeat because wells will bring up water rather than let water down.

Q. As I understand it, land in this delta zone and the surrounding land is land that drains off water and not land that detains it?

A. The ground is too dense for mechanical flow of water vertically, water moving under capilarity. The surface portion that is attacked by frost to a depth of 5 or 6 feet is sufficiently loosened to take up rain water. Shallow wells are obtained all over the area on favorable slopes by digging down to the bottom of the frost zone and then enough deeper to make a retaining basin or cistern and the water collects from the subsoil into these little wells. In dry seasons that water all disappears. In the deep wells, which go down from 50 to 200 feet in different places, in most cases meet with gravel or coarse sand and those serve as collecting reservoirs, taking water

which is coming horizontally through the ground and placing it in artesian wells or flowing wells. So that over a great part of the area extending from south of Norcross westward towards Wheaton it is known that there are and I have seen a number of flowing wells.

Q. What would you say as to the character of these lands in this delta zone and the surrounding lands as agricultural lands?

A. They are generally considered practically all No. 1 agricultural lands and in our land classification we map them as such.

Q. Why?

1332 A. Well, they are made up of a variety of accumulated mineral substances, such as to make a rich soil and there is an accumulation of organic matter, humus, to a sufficient depth so that the lands are very rich lands.

Q. Does that characterization extend to all of these lands in this so-called delta zone and the surrounding lands?

A. One would need to make exception for the beaches, the Herman beach and a small part of the sand bars in the lake but otherwise the ground is all rich proverbial Red river land.

Q. This Redpath slough, the land in the Redpath slough, might that also be denominated agricultural land?

A. That is too flat to be safe agricultural land until it has been tiled.

Q. Well, if it were tiled, if it were thoroughly drained, is it such land as is suitable for agriculture?

A. Yes, sir, it would be very suitable, especially for potatoes, clover, variety of crops; perhaps better for those than for wheat, it makes a warm soil.

Q. So that, Professor Sardeson, outside of these Redpath sloughs and, as you say, a small area of the Tintah slough which is probably not here material, is there any difference between the lands in this so-called delta zone and the other agricultural lands thorugh that section?

A. I know of none.

Q. Did you observe and study the ditching operations in all this section as indicated on this map, Defendant's Exhibit 7?

A. Not on all of the area but I went practically the full length of the Mustinka state ditch and crossed and went along numerous other ditches in that district.

Q. What would — say as to the necessity of the drainage of those lands drained by those ditching operations?

A. Well, on land that is so smooth, is is always an advantage to have a drainage system, ditching and tiling. The ditches serve a double function of reservoir and delivery channels. In flat land I understand that a ditch 45 feet wide and 10 feet deep and a mile long will hold enough water to cover a square mile an inch deep, so that very frequently a ditch through a level or smooth piece of land serves the immediate purpose of gathering the water from

1333 nareby acres; then of course the ditch is presumed to serve the function of delivering those waters and when successful maybe they do so.

Q. I wish you would describe from that standpoint of advanta-

geous drainage of lands this Mustinka state ditch beginning first with the upper or first section constructed and the later constructed.

A. In answereing that question I will probably have to introduce a third factor in making of ditches and that is the advantage to the farmer of turning streams off of the fields into the boundary lines, section lines. The first Mustinka state ditch took the river off of the sections and onto the quarter line and section line for the greater part, making a more *sta*isfactory stream from the standpoint of agriculture. However, it runs in a somewhat artificial direction and naturally does not deliver the water as well as it would if it had been constructed along its original direction of flow and with a view to control floods.

Q. Why do you say that is was constructed in an artificial direction?

A. Well, it runs nearly straight westward instead of in a north northwest direction, follows a sectional direction instead of the original drainage direction.

Q. What is the true drainage direction along the line of this first Mustinka state ditch?

A. It should have been first from near Norcross westward to the west line of Section 23, Redpath township, and then west northwest to Section 7. Instead of that it ends a mile and a half or nearly two miles further south.

Q. How did that effect its capacity to carry the water from the Redpath sloughs?

A. The ditch isn't large enough and never was large enough to carry the floods which come into it and overflow from the ditch takes the old course of the stream. At a stage of low water or middle stage of water the delivery is along the ditch but in a high stage of flood not only is the ditch submerged but even the embankments thrown up along the ditch in some places are under water and the ditch no longer functions because it is merely a groove in the bottom of an inundated flood plane. The flood goes as it did in a state of nature.

Q. Where?

A. Down to Section 7 along the course of the Mustinka river, across the Redpath sloughs.

1334 Q. And ultimately finds it way where?

A. Into the channel which is properly the channel of Twelve Mile creek but is designated Mustinka river.

Q. Did you observe anything about the direction of the flow of these flood waters as you speak of them to the northwest rather than along the lines of the old Mustinka river?

A. Yes, the tributaries to the Rabbit river end in well defined though shallow draws which head close up to the course of the Mustinka river. One of them comes up nearly to Norcross, nearly to the river west of Norcross, or two of them I think I found there. One heads in Section 13 of Redpath township and runs northwesterly to the Tintah slough district. Another one heads in a little pond on Section 1 of Monson, and the heads of these tributaries are so close to the Mustinka river that in times of very high flood the Mustinka

backs up into these tributaries and overflows, thus delivering water at several points over into the Rabbit river.

Q. What effect did this first Mustinka ditch have upon the flow of those surface waters to the northwest and into the Rabbit river?

A. It had none at all because in time of flood the ditch was negligible as a factor.

Q. And does the present construction assist any in preventing waters from going over northwest into the Rabbit river the same as before, the flood waters?

A. You mean the cut-off?

Q. Yes, rectified channel.

A. So far as the overflow near Norcross and on Section 13 the flood has already left the Mustinka ditch before it reaches the new cut-off and therefore is not affected by the cut-off. Down on Section 1 I couldn't say whether the cut-off—in what way the cut-off prevents overflow there. If successfully made it should do so, but I was not able to make any determination or observation further than that the overflow was there.

Q. That is, to the northwest?

A. To the northwest.

1335 Q. Into the Rabbit river?

A. Into the Rabbit river, yes, sir.

Q. You say this first section of the ditch ran in an artificial direction, that is, as I understand you, it ran more or less, you might say, along the side hill rather than following the natural course of the water?

A. Yes, sir.

Q. And from an engineering standpoint and the standpoint of drainage was it a successful propos-tion, Professor Sardeson?

A. Well, I don't know what their engineering plan was. If their intention was to dry out the Redpath slough so that it could be mowed more successfully in late summer or summer time, their plan was successful, but if it was the intention to control floods my opinion as far as that has any weight would be that it was an entire failure.

Q. Now, I wish you would speak more particularly of the new construction, the cut-off portion and the rectified channel below as a drainage proposition.

A. Every river has two streams normally in this state and in our climate. Every river valley which I have had occasion to study must be looked at from the standpoint of a double utility. There is the normal stream which makes a channel and there is the flood stream which comes an-ually or periodically. The Mustinka is like most other valleys, it has a distinct channel and in a state of nature had a channel carrying the river at ordinary stages. But at high flood there is a flood plane, and undoubtedly very ancient one, showing that the river has from the time of its origin in that valley carried floods. This flood plane is narrowest down near the mouth of the river and widens; with the eye one can easily mark out i-s limits back up to the Swedish church at the end of the cut-off where it is about a mile wide. In rectifying the channel, this really appears

to have been done with a view to the normal channel of the Mustinka river and without any regard to the flood stream. The meanders of the stream are filled in many cases and embankments are thrown up outside of the rectified channel and in one place this embankment along the stream forms a dam completely across the deeper part of the valley for one-third of its width. That is on Section 5 of Lake Valley township, northwest of Wheaton. It goes two-
1336 thirds of the width of the valley from the south or east bank of the flood channel across the deeper part of the valley, two-thirds of the width on Section 7, north of Wheaton. In the northeast quarter of Section 23, which is two miles west of Wheaton, the embankment goes entirely across the valley leaving only the rectified channel as an outlet. This embankment has been surmounted by the flood waters in three or four places showing that the water rose not only to full capacity of the channel but to the added capacity of the greater part of the height of the embankment above the channel.

Q. Then so far as the control of the flood waters are concerned what would you say about this last section of the Mustinka ditch?

A. Well, I should say that the engineer did not take the flood conditions into consideration in his plans. At least, in the execution of the plan no regard was apparently taken to the necessity of leaving the original flood plane open for use and sufficient provision was undoubtedly not made to confine the flood waters within the channel.

Q. Why?

A. Well, the channel is not large enough to carry the flood.

Q. What effect then does this rectified channel have on the flow of the waters there in flood times, Professor Sardeson?

A. Well, I couldn't make an estimate from the conditions as to just what the effect would be because I was never there in time of flood but I can plainly see that the conditions are such as either to not relieve the condition materially or possible to be an actual hindrance to the flow of the flood waters.

Q. It has been stated here that the effect of this rectified channel is to hasten the flow of the flood waters, down into Lake Traverse.

A. I think that would be true of the channel and of the water that filled the channel, but it would be just on the contrary of the water as soon as it left the channel and undertook to use the flood plane.

Q. Did you make an examination of this cut-off ditch there and also of the channel of the river on around north of the bend?

A. I went the length of the cut-off and saw the channel around the bend at a number of points sufficient to satisfy me as to its character.

1337 Q. I wish you would describe that northerly bend of the river.

A. Well, the bend is practically in a state of nature, as it originally was. It is not grown up to weeds or willows as is usually the case with an abandoned channel of that kind. There is a bar thrown across the channel, a little above the height of standing water, pool water, a short distance below where the cut-off begins but

very obviously the channel is still in use by the drainage system, by the Mustinka river.

Q. Did you make an examination at the beginning of this new cut-off ditch with the Twelve Mile creek to determine which was the dominant stream?

A. Yes, sir, the Twelve Mile creek and including the channel both south and north of the mouth of the cut-off is the dominant stream. At the bridge it is cut 6 feet below the water level, the water being just high enough to trickle down the cut-off ditch. So that there is an excavation of 6 feet, of a depth of 6 feet greater northward in the old channel than there is in the cut-off ditch.

Q. 6 feet deeper?

A. Yes, sir, and other signs to indicate that in time of flood the Twelve Mile creek, which has been diverted a little into a new channel south of the cut-off, comes with sufficient force to carry its current past the mouth of the cut-off ditch.

Q. Without entering the cut-off at all?

A. Well, the sand or gravel or such materials coming down Twelve Mile creek would mainly follow the old channel northward.

Q. What I want particularly to know is whether the Twelve Mile creek as it comes down and sweeps past the mouth of this cut-off, turns and goes into the cut-off or goes on around this bend?

A. Well, the greater part of it goes on.

Q. There is a bridge just to the north of the mouth of the cut-off?

A. Right at the mouth of the cut-off.

Q. Across the old channel?

A. Yes, sir.

Q. Did you see any indication there as to the strength of the northward flow of the creek?

1338 A. The current going northward there had swept the roadway and the land, bent down willow trees, deposited debris as floods do in such a way as to indicate there was a strong flood went northward not only under the bridge but over the road.

Q. How high were the willow trees that were bent over?

A. 10 or 12 feet high, at least.

Q. Then as I understand it, this was northward or below the mouth of the cut-off?

A. Yes, on the north side of the road, north of the bridge.

Q. I want to ask you about the old Mustinka ditch as it comes in and meets the Twelve Mile creek from the west at this point that we have been discussing.

A. At that point where the old ditch and its continuation of the cut-off crosses Twelve Mile creek the channel of the Twelve Mile creek has been changed by rectification to the south of the bridge and the whole effect is to leave a large basin on the east side of Twelve Mile creek and the old Mustinka ditch empties into that.

Q. And the current?

A. And the current, of course, catches it but the bottom of the ditch is not as deep as the bottom of Twelve Mile creek.

Q. So that the probabilities are that part of that water goes on

around the bend in the current and part passes on to the cut-off, is that what you mean?

A. I should think the water coming from the old Mustinka ditch must necessarily go around the bend for the current of the Twelve Mile creek cuts it off between it and the mouth of the cut-off ditch.

Q. Did you walk up this old Mustinka ditch from that point to its source?

A. Yes, sir.

Q. What is its state of repair, describe it generally as it appears now.

A. It has been very greatly eroded and some places it is out of the original course of the ditch, it has meandered out of its original place. There are willows along the bank and in some places in the channel. In general there has been a deepening of the ditch and probably in some places some filling but I did determine that it is in bad repair.

Q. What do you mean by that, in bad repair?

A. There are obstructions along the channel making a very much greater friction than the ditch should have had in its original state.

1339 This new cut-off part from Twelve Mile creek on westward, will you describe that?

A. That caves in on the sides and a greater part of what is caved in from the banks has been swept along and out of it. There has probably been some deepening. The bridges which cross the ditch, however, appears to show no—reason I expected to find a pool or deepened erosional pond under the bridge to compensate for the narrowing—the narrowness of the bridge but there appeared to be none.

Q. What would this indicate?

A. It indicates, I should say, the *the* flow is comparatively sluggish at high stages of water and that the passage under the bridges is adequate.

Q. Would it indicate anything as to whether the cut-off had flowed full of water?

A. There are marks along the banks showing how high the water stood in the last flood. Those were from 3 to 4 feet from the top of the bank all along, so it is easy to see where the flood water was at the last flood that went through there.

Q. From 3 to 4 feet below the top of the ditch all al/ong?

A. Not all along but at the high parts of the ditch, as I remember. I am making that statement from memory.

Q. In your examination of this old channel around the bend, what did that disclose as to its being a working functional channel to pass the water?

A. It has no obstruction, there are no willows growing in it, the bars are sand bars, gravel bars, and while there was no water flowing in the channel at that time the bed of the channel was that of a stream that had just been used.

Q. Did you examine the conditions at the outlet of the cut-off into this Mustinka channel?

A. Yes, I looked at that with more detail than in most places because it appeared at first glance that the water coming from the old channel was dominant over the current to sweep to the westward side of the rectified channel and erode the banks. I found the contrary to be the case; the water coming down the old channel pushes itself across the rectified channel at the mouth of the cut-off and has worn away several feet of the bank on the other side.

Q. On which side?

A. On the east side or south side, showing that in time of
1340 flood the water coming from the main channel practically pushes the water from the cut-off to one side, that is, it strikes under it, and reaches the opposite bank of the Mustinka river. There are bars built in the mouth where the two come together, the two channels come together, at a low angle and there are bars there consisting of gravel and those bars are placed in a way to show that the water coming from the old channel dominates over that coming out of the cut-off?

(At this time recess is taken until 10 o'clock A. M., October 3, 1917.)

October 3, 1917, at 10 o'clock a. m.

FREDERICK W. SARDESON, being recalled for further direct examination, testified as follows.

Examined by Mr. Palmer:

Q. Will you state, Professor Sardeson, more in details the operation of this cut-off from the Twelve Mile creek across to the Mustinka channel again from your observations there and from your experience and observations of like streams and constructions?

A. The cut-off ditch carries only part of the water from its beginning down to where it joins the old channel and its length is much less than that of the old channel around the bend, as it has been called, and it should have a more rapid fall and a more rapid current than that of the old channel, but at high stages of water its connection at both ends is not natural. The cut-off should be a continuation of the upper Mustinka ditch but as a matter of fact the Twelve mile creek comes in from the south with a strong current at that point and practically divides the upper Mustinka flow from the end of the cut-off. The current of Twelve Mile creek, being, especially stone, flowing at right angles across the upper end of the cut-off ditch, tends to carry water by rather than deliver it directly to the cut-off. A great amount of erosion under the bridge, making Twelve Mile creek channel some six feet deeper than the bottom of the ditch, shows that a large current exists there and that a large amount of water goes by the end of the ditch northward. At the lower end of the cut-off where the old ditch and the cut-off join at a low angle at low water stages, embankments were thrown out from the cut-off
1341 and the rectified channel in a way that at high water stage the flood coming around the bend, flows into the rectified chan-

nel at right angles instead of at a low angle and it is in such volume at that point that it strikes the opposite side of the Mustinka and must tend to cause a retardation in the cut-off ditch. These conditions lead me to believe that the cut-off carries actually less water than its capacity as measured by cross-section would indicate that it should carry.

Q. What portion of the water in your opinion arriving at the beginning of the cut-off is carried by the cut-off and what portion by the old channel around the bend.

A. The minor portion goes through the cut-off and the main body of water goes around the bend in flood times.

Q. The water from the first section of the state ditch as it enters there at this commencement of the cut-off or, rather into Twelve Mile creek, in your opinion by which channel is that carried, the cut-off ditch or the river channel around the bend?

A. That would have to go around the bend.

Q. Why?

A. Because there is a strong stream of the Twelve Mile creek coming in from the south at right angles with sufficient velocity to prevent any water from carrying from the old section of the ditch directly over to the mouth of the cut-off.

Q. Did you observe particularly the current, the quantity of water in the Twelve Mile creek at this beginning of the cut-off?

A. Well, at the time I visited that place the water was low and very little water flowing but it was obvious that the Twelve Mile creek itself had been straightened south of the cut-off and its velocity increased thereby and the evidence under the bridge and around the bridge and over the roadway and among the trees on the east side of the flood plane or Twelve Mile creek all indicated that a strong volume of water went northward.

Q. The bridge and roadway you are speaking of now, are the bridge and roadway east and west across the channel of the Twelve Mile creek, a little north of the beginning of the cut-off?

A. Yes.

1342 Q. It has been testified here that county ditch #23 coming in to the Twelve Mile creek two miles south of the beginning of this cut-off brings across in large part the waters of Five Mile creek into Twelve Mile creek. Would that tend to augment the volume and velocity of the flow in the Twelve Mile creek at the mouth and velocity of the flow in the Twelve Mile creek at the mouth of the cut-off also?

A. Certainly.

Q. I don't understand quite what you mean by saying the *the* channel of Twelve Mile creek here at the mouth of the cut-off is straightened by this excavation.

A. Yes, as I observed and was told upon inquiry, the Twelve Mile creek originally was not so straight at that point, and for some purpose which I did not understand they had gone up the stream a quarter of a mile or thereabouts and diverted the original Twelve Mile creek, bringing it straight north.

Q. Straightened the channel?

A. Straightened the channel.

Q. About a quarter of a mile?

A. About a quarter of a mile or so.

Q. To the south?

A. Yes, sir; so that there exists at that place a rapid fall in Twelve Mile creek.

Q. And was the channel of Twelve Mile creek for this quarter of a mile to the south there both deepened and straightened, apparently?

A. It appeared to be such as to carry all the water that came from that direction at least.

Q. I didn't clearly understand what you meant in speaking of some bars being over in the channel of the Twelve Mile creek around the bend. Where are those bars, how far down-stream from the cut-off?

A. I might explain that. When I found that there had been gouging out of the bottom of the channel of Twelve Mile creek under the bridge, I looked to see where that material lodged and at a distance of, I think, much less than an eighth of a mile around the first curve below the bridge and just out of sight from the bridge, I found that there was a deposit of sand and gravel high enough to divide the standing water in the channel that was at the bridge from the standing water immediately below the bridge. The bar did not come up appreciably above the level of the water which stands impounded in the channel below the bridge.

1343 Q. I take it that you looked for these bars in order to ascertain where the material gouged from under the bridge further to the south had been deposited?

A. Yes, sir.

Q. Did that deposit in the bed of the channel have any appreciable effect upon the flow of the water?

A. No, it simply indicates that at that point the capacity of the channel was such as to carry the water without any scour of the bottom at that place, so that the bar merely fills a place in the channel that wasn't needed by the current.

Q. Did you observe, Professor Sardeson, the course from there down by the Teske farm as it has been called, the southeast quarter of Section 1 in the town of Monson that overflowed waters from the Mustinka over into the Rabbit river?

A. Yes.

Q. What did you find there?

A. I found the channel of a draw which at one stage in time of rain and flood leads down to the Mustinka river.

Q. From the southeast quarter of Section 1?

A. It leads from Section 6 across the section corner and along the northeast side of Section 12. I found that the water had come up that and gone under a culvert which exists at that place and had gouged or washed out the bank of the ditch to the north and then had spread to the northward from that point.

Q. Did you find that this flood channel of which you speak had gone northerly into Section 6 and then on to the north?

A. From the lay of the ground I understand that the water coming through at the culvert by a sort of back-water movement up this draw which I have just described spread out over the divide and flowed northwestward and came in in a northerly and finally in a westward direction and converged in a pond. There is a long narrow slough or pond which is the convergent line of the sheet flood as it goes across the divide from the draw leading from the Mustinka into the draw which is the head running to the Rabbit river.

Q. And that is the little lake that Mr. Teske has described existing north of his buildings in his pastures?

A. Yes, sir, and on account of those features I felt certain
1344 that the flood had come over there in considerable volume, the pond not being explainable on any other assumption. I saw no evidence whatever of any overflow to the eastward of that on Section 6.

Q. So this channel that has been described by the Witness Ralph as extending up into Section 6 and then turning northerly and northwesterly and coming back across the west line of Section 6 and into Section 1 wasn't found by you?

A. Well, I was told that the water went that way, and saw at the time that it did not——

Mr. Boutelle: We don't care what you said at the time.

A. It didn't look at all probably, that water could have gone through that way.

Mr. Palmer:

Q. You say now that it didn't?

A. That is my opinion at the present time.

Q. Did you make observations to determine whether the overflow water from the old Mustinka channel from this southeast quarter of Section 1, crossed to the southeast corner of Section 2, overflowed the south bank of the river and went southerly and westerly back into the Mustinka channel again?

A. Yes, there are draws leading to the Mustinka westward the heads of which are so low that the flood must necessarily go across there when it overflows to the northward.

Q. Is there as much evidence of these overflow channels to the south and southwestward over the south bank as there was to the northward over the north bank?

A. Yes, sir.

Q. Continuing now down-stream in this old Mustinka channel, it has been testified here by Mr. Heggen that this county ditch #27 constructed in 1916 and county ditch #36 constructed also in 1916 as shown on Defendant's Exhibit 7, have considerable effect upon the flow of the water in the flood plane from the mouth of the cut-off ditch down to the Milwaukee Railway track, Professor Sardeson. I

wish you would state just what conditions you found in that flood plane down there.

A. Those ditches have roadways along them or embankments which of course obstruct the flood plane. The ditches are run on the section line and without any regard apparently to their effect on floods and the effect must necessarily be to obstruct the flood and produce somewhat of a condition of standing water rather than flowing water on the flood plane.

1345 Q. And continuing further down, we will say there at the railroad bridge and the wagon bridge below, what are the conditions there?

A. There are embankments also which obstruct the flood plane.

Q. And what about the outlet area?

A. Well, down on Section 23 where the flood plane is well defined, deep and relatively narrow, about a quarter of a mile wide, the stream originally meandered from one side of the flood plane to the other and the dredged channel follows some of those meanders, so that in one place there is a double embankment entirely across the valley with the exception of the channel and at those places it is obvious that the flood plane was occupied by standing water instead of running water. That is, where there was running water in the flood plane in a state of nature there is now standing water only.

Q. So taking the whole construction into consideration, the effect of these other ditches that have been put across the flood plane too, what would be your opinion as to any acceleration of the flow of the water by this later ditch construction from the beginning of the cut-off clear down to the end of the ditch?

A. Well, as far as I can form a clear opinion, I think the valley is rather obstructed than improved.

Q. I want to ask you something about the conditions of standing water in the lower part of this ditch and the Mustinka river; did you make some observations as to this?

A. At the time when I was there, September 5 and 6, 1917, there was very little water running in the Mustinka river, a small stream two or three feet wide and an inch deep only, but from a point a mile below the railroad bridge down to the lake there was standing water in the channel, so that the back water was up the channel about four miles from the lake. The wind was then in the north. There was standing water continuously from that point down to the lake.

Q. In flood times how extensive do you think that backing up of the water in the channel is, how far does it extend up-stream?

A. Well, I didn't make any measurement or any estimate with a view to determining that but, of course, when the lake is high the back water is proportionately great.

Q. Before leaving this Mustinka channel I want to go back to this cut-off ditch again, and ask you whether that is constructed along the line of the natural flow of the water.

1346 A. You mean the cut-off?

Q. Yes.

A. Well, the direction of the ditch is right in that it shortens the

distance for the delivery of the water but the upper end of the ditch is not joined naturally into the channel there. If it had been joined with a curve with Twelve Mile creek in such a way that the flow from Twelve Mile creek did not interfere with the flow coming from the upper Mustinka ditch; if, also, at the lower end of the ditch the embankments had been removed and the cut-off ditch had been made of sufficient capacity to carry all of the water, then I should say that it would have been made along right lines to give rapid discharge of the water.

Q. But as it is, from an engineering standpoint, take this entire later construction of this Mustinka ditch, from a drainage standpoint or an engineering standpoint, is it successful?

A. It appears to me not successful in so far as the control of floods is concerned.

Q. Did you make some observation of the county ditches that had been put into the Twelve Mile creek and into the rectified channel of the Mustinka?

A. I saw many of the ditches, I can't say just how many now.

Q. It has been testified here that the effect of these ditches is to make the run-off into these streams more rapid than in a state of nature when the ditches were not there and when the lands were uncultivated and covered with prairie sod and grass.

A. That is a very difficult matter to state positively for the reason that more than one factor enters into the making of ditches there as well as other places in Minnesota. Some of those ditches are made primarily to divert waters off of the field along section lines, in order to give larger unbroken field area. The ditch in that case may or may not work well. Also ditches on smooth surface of that kind serve the purpose of collecting water from near-by field, even if the ditch had no discharge. It holds a volume of water and obviously what is in the ditch is not on the land. Then also the ditches legally and from and engineering point of view are undoubtedly intended to carry off the water faster to get rid of it from the land.

But the natural direction of drainage is not followed. The
1347 ditches run east and west and north and south on division lines rather than on the natural lines, making a sort of grid-iron of reservoirs and in some cases the ditches increase the distance that the water must flow though I think on an average they would decrease the distance that the water should flow. For these reasons I am not able to say whether the ditch systems leading to the Mustinka river positively do increase the rapidity of flow into the river but I should hope that they did because that is what they are supposed to be made for. It would be impracticable for me without having observed the operation of each of the several ditches, without knowing in detail how they work in time of flood, to give an opinion that would be such as I should wish to give in responce to that question.

Q. The effect of increased cultivation of the lands and their drainage on the amount of the run-off?

A. Where there are originally dry lands during most seasons, either sod or plowed land, the frost loosens the ground and makes

a distinct, marked subsoil a distance of 5 or 6 feet, and this takes up water in a way which the ground beneath the subsoil will not. Along the ponds and sloughs and places that are saturated during the winter time the frost does not act in that way. The bottom of a slough has a compacted foundation which is silted. The sloughs in this whole region are water-tight in a way which is well known to me and, I think, to everyone acquainted with the region, so that a well can be put down on an island or alongside of a lake or slough and well-water will not be found within 50 or 60 feet from the bottom of the lake or slough. In fact, I have seen a driven well standing in a pond of water which could be easily pumped dry, yielding only two or three pails of water in a day, while the water was standing for rods around the vertical pump rod, demonstrating that in cases where there are sloughs the water from the droughs does not escape into the ground. It is practically a surface basin. But when those sloughs are drained out so that the saturated condition of the surface is broken up, the frosts of a few winters converts the bottom of the slough to the same condition as that of the normal prairie sod or plowed field so that it is in a condition to take up water.

1348 Q. What effect does the drying out of the land by those ditches and by cultivation during times of little rainfall have on the run-off of the lands in times of heavy precipitation?

A. The ditching and general cultivation of the country is giving more subsoil reservoir space.

Q. Did you make a study of the conditions at the confluence of the Rabbit River with the Bois de Sioux river with a view of determining whether the influx of the waters of the Rabbit river had a tendency to set back the flow of the water in the Bois de Sioux?

A. Yes.

Q. Will you state as far as you can the conditions you found there and your conclusions, Professor Sardeson?

A. I found the Bois de Sioux channel uniform comparatively. The Rabbit creek or river channel is irregular with a succession of erosion basins or what I call plunge basins with standing water in it. At the junction of the two streams, which is at right angles, there is a plunge basin of the Rabbit river right across the channel of the Bois de Sioux. The banks of the Rabbit river are at the confluence about 2 feet higher than the west bank of the Bois de Sioux, so that if both channels were full of water the effect would be for the Rabbit river to push the Bois de Sioux over its west bank. I found at the time that I visited that place both channels were practically without flow of water, so that I could see the bottom completely excepting under the plunge basin at the mouth. There is a bar running out on the upper side of the mouth of the Rabbit which is from 5 feet down to 1 foot high. This bar is make of sand and gravel carried from the Rabbit river and thrown across the channel of the Bois de Sioux and the lower part of it is grown up to willows, some 10 or 15 feet high. Willows are clugged with weeds and grass, showing that the current of the Bois de Sioux sweeps through there with some force, sufficient to bend the willows down when the current is running. From that circumstance I concluded that the Bois de Sioux

is checked at that place even when the Rabbit river is not flowing and with that bar across the Bois de Sioux channel and with a heavy current as might be from the Rabbit river coming in, there
1349 would undoubtedly be back water up the Bois des Sioux.

The current from the Rabbit river is undoubtedly strong because the west bank of the Bois de Sioux is at that point, opposite the mouth of the Rabbit river, eroded, that is, the sod has been washed away and pebbles the size of my fist have been carried from the mouth of the Rabbit river, partway up the west bank of the Bois de Sioux and there is a gravel riffle from the point of the bar across to the west bank of the Bois de Sioux over which a very small stream was flowing when I was there.

Q. So the whole conditions there would indicate to you——

Mr. Boutelle: That is objected to as far as it has gone as leading.

Mr. Palmer:

Q. — would indicate to you that which of those streams was the dominate stream, Professor Sardeson?

A. The Rabbit river is the dominant stream at that point when both are flowing.

Q. Would the indication there lead you to believe that the Rabbit river did or did not carry more water in recent years than formerly?

A. Yes, the west bank of the Bois de Sioux opposite the mouth of the Rabbit river is torn up and eroded with erosional identation there that is new, as of only a few years standing, indicating that the volume coming from the Rabbit river at times is greater than it used to be.

Q. Did you make some examination to determine why there was an increase in the volume of water carried by the Rabbit river now over former years?

A. No, nothing in particular.

Q. Did you make an examination of those various ditches that are shown on Defendant's Exhibit 7 as having their outlet into the Rabbit river?

A. In 1912 I saw all of those ditch systems in North Ottawa township, and, of course, a large part of that land is entirely controlled by drainage systems, and in some cases there was so slight a fall upon the land that the whole area had been regarded by plowing so as to fit into the ditch system, but I couldn't say under the circumstances definitely that that increased the amount of water that goes down the Rabbit river.

Q. The other ditch systems that are shown to outlet into the Rabbit river here you didn't examine?

A. I saw the Tintah ditch on this occasion. It runs into the Rabbit river; and the judicial ditch #3, which leads into the Rabbit river in Champion township.

1350 Q. Professor Sardeson, I wish you would describe more in detail the lands in this so-called Bois de Sioux valley, beginning with such lands south of White Rock as are not submerged

and proceeding on northerly to the mouth of the Rabbit river from a geological standpoint.

A. Geologically all of that land northward from the lake is the old bed of the glacial river Warren. It was orginally covered with a concentrate of boulders, familiarly spoken of as boulder pavement, and a large part of the land has numerous boulders upon it yet. I saw some fields which undoubtedly had been cleared of the greater part of the boulders. This stony condition resulted from the river having cut away a depth of over 100 feet of glacial drift in making its channel and in leaving all larger stone in the bottom of the channel, and going northward the amount of cutting was much less. As a consequence *of* concentrate of boulders is not so great, although the boulders are numerous as far north as Blackmer. The surface of the valley appears to me to be essentially the original bed of the river Warren with very little subsequent modification, although there are some channels leading northeasterly from the upper end of Clubhouse lake across the White Rock road and in addition to the Bois de Sioux channel which have been eroded. Those, of course, have been for a long time the natural courses of flood waters across the valley. That is the natural condition from a geological point of view.

Q. I want now a statement of the artificial conditions that you found there in that Bois de Sioux valley?

A. I saw the White Rock road which has been described in previous testimony.

Q. Tell us its effect.

A. Its effect, of course, is to hold back flood waters, the openings through the wagon road being obviously in great disproportion to the original natural channels through there. Then from White Rock, at the northwest corner of the village, I traveled a road northward to opposite Blackmer. That is a turnpike road from 1 to 4 feet high. There are culverts where the road crosses drainage channels but those are also small and it is very obvious that the roadway is an obstruction for the discharge of any large volume of water through there. Then there were east and west roads on nearly every section line, which were turnpike roads raised from
1351 1 to 3 feet, especially one road two miles south of Fairmount which was a well built up roadway, I should say, some two feet above the plane, and I followed the turnpike road clear down into the channel of the Bois de Sioux. I went to the end which had been eroded away by the flood. The upper side of the turnpike road had been cut off for a distance of 3 or 4 rods nearer to the west bank, than the lower side, of the channel.

Q. Did this turnpike road extend across the channel of the Bois de Sioux?

A. It may have done so originally but it has been washed away.

Q. There is no bridge there?

A. There is no bridge there, no, sir. There is also the Milwaukee railway grade which traverses the valley. It goes across the direction of the discharge of waters through the natural channels.

Q. What effect does that have?

A. Somewhat the same as the roadways. Of course, the grade is above the level of ordinary floods and the passage of water must depend upon the capacity of the culverts or bridges left in the railroad.

Q. So in general what would you say as to the effect of these artificial conditions?

A. They appear to have been built without due regard to floods and, of course, are in a position to retard and concentrate flood waters, thus aggravating the flood.

Q. And how about the length of time that the flood waters remain on the lands, what effect would these artificial conditions have?

A. They would, of course, tend to increase the ponding of the water and holding them back onto the land.

Q. The effect of the influx of Rabbit river, the back-water effect?

A. At times when the Rabbit river is not running that bar across the Bois de Sioux undoubtedly has the effect of a submerged dam and at a time when the Rabbit river is running it adds its volume at that point and thus undoubtedly making a back-water for some distance up the valley. Of course, theoretically that back-water should reach with diminished intensity clear up to the Bois de Sioux outlet of Lake Traverse, but perhaps practically it extends only to somewhere near the bridge east of Fairmount.

Q. But that would, in your opinion, in a measure account for the increased flooding in recent years of the lands in the vicinity of Fairmount?

1352 A. Well, I haven't stated there is an increase of flood in recent years but it would account for an increase in floods.

Cross-examination.

By Mr. Boutelle:

Q. Professor Sardeson, I understood you to say that you became an instructor and assistant professor in something in the University of Minnesota in what year?

A. I was for the first time appointed scholar in 1892, was made instructor in 1894 and again in 1898. I have forgotten when I was made assistant professor but it was a matter of promotion.

Q. And that was in what branch of the studies of the University?

A. In the department of geology at the University.

Q. And who was the head of that department at the time of your appointment?

A. C. W. Hall.

Q. And you remained as an instructor in that department for how many years?

A. Altogether 16 years.

Q. And during that time how many changes were there made in the University's department of instruction there so far as heads were concerned?

A. One.

Q. And the head of that department of the University to succeed Professor Hall was who?

A. William Emmons.
Q. Is he still there?
A. Yes, sir.
Q. When did Professor Hall sever his connection with the University?
A. At the time of his death.
Q. And that was when?
A. About 1912.
Q. And you remained as assistant or an instructor under Professor Emmons?
A. I remained assistant professor under Professor Emmons.
1353 Q. And you continued to occupy that position as long as you remained at the University?
A. Yes, sir.
Q. Then am I correct in addressing you as Professor Sardeson throughout this cross-examination, you having never occupied a chair or professorship in the University?
A. Yes I have, assistant professor.
Q. Assistant professor of any other university?
A. No, sir.
Q. Your sole college or university experience has been that in Minnesota?
A. Yes, sir.
Q. You have told us that during the time you were an instructor or assistant professor you were engaged in certain work connected with the Geological Survey?
A. Yes, sir.
Q. When did that commence?
A. In 1911, that was the second time I was employed by them.
Q. Was that your first employment with the Geological Survey?
A. No, I worked for them temporarily in about 1890.
Q. That was temporary employment?
A. Yes, sir.
Q. Your service became more regular in connection with the Geological Survey in 1911?
A. Yes, sir, meanwhile civil service rules had been adopted, my second employment was under civil service.
Q. You mean by that they couldn't help keeping you?
A. No, I had not been working for them for a number of years.
Q. But the civil service reinstated you?
A. No, I passed the examination as a formality and was appointed geologist.
Q. And in what did your work for the Geological Survey consist?
A. In studying the glacial deposits of Minnesota.
Q. And that extended generally over the state?
A. Over the whole state.
Q. Were those studies in connection with anyone else?
A. I worked in co-operation with Frank Leverett of the United States Geological Survey.
1354 Q. He was in charge of the work?
A. Yes, sir.

Q. And you were an assistant, doing certain details, I suppose, under him?

A. No, we are both geologists of the United States Geological Survey and I worked in co-operation with him and we publish results as co-authors.

Q. I didn't ask you if you published anything, I asked you if Mr. Leverett was in charge of that work?

A. Strickly speaking the work was in charge of what we call the chief of section.

Q. Who was the chief of section?

A. Dr. Alden.

Q. Who was under him in charge of it?

A. Mr. Leverett and myself.

Q. You were of equal rank in that work, Mr. Leverett and yourself?

A. Except he was the senior geologist, that was all.

Q. And as a result of those studies which extended over several years, I understand you to say, a geological bulletin was published?

A. Yes, sir, first folio, the St. Paul-Minneapolis folio, and the Herman-Morris folio, in which I did the work entirely alone, bulletins on the agricultural and soil conditions of Minnesota published by the University of Minnesota in which we are joint authors, and other work has not been published yet.

Q. And over how many years did that work extend?

A. I worked with him temporarily in the fall of 1909 and then again in 1910 during the summer, preceding the time when I accepted a commission.

Q. You have referred to the fact here that your position is known as #67. Are you aware that there is no such system in the United States Geological Survey and that the men are not designated by numbers?

A. No, sir, I have a card in my pocket with that number of it. (Hands card to counsel.)

Q. That is the number for a certain amount of work?

A. It is the card I have, given to identify myself if anyone questions my standing.

Q. That is a card that is given to you #67?

A. Yes, sir, it is used——

1355 Q. I didn't ask you what is was used for.

Mr. Palmer: Make you- answer as full as you care to, Professor Sardeson. We will put the card in evidence.

Mr. Boutelle:

Q. The card which you showed me and which I am perfectly willing if your counsel want to should go in evidence is #67?

A. Yes, sir.

Q. From that you assume that your number in the Geological Survey is #67, don't you?

A. No, sir; when I buy a railroad ticket——

Q. I didn't ask you about a railroad ticket.

A. —on that card it is charged up to me as #67; the number but not the name is sent in to Washington.

Q. The card bears the number of 67?

A. Yes, sir.

Q. And how long did you continue on that work?

A. Until that work was completed.

Q. When was that?

A. 8th of December, 1915.

Q. Since that time what work have you been doing as far as the Geological Survey is concerned?

A. I corrected manuscript; I received all communications from the Survey that in any way affect a member of the Survey but there has been no allottment assigned me and I have been permitted to take up work with the Minnesota Reclamation League with a view to solving the difficulties that have arisen in relation to drainage and flood control in Minnesota.

Q. When was that?

A. I began regularly and officially the 1st of September a year ago.

Q. How much time did you spend in the field in connection with the reclamation league?

A. Only part of my time is out in the field. I went through the auditors' records of about 15 counties in Minnesota a year ago and I attend meetings and conferences and committee meeting- of the legislature with a view to lear-ing all that I can.

Q. A sort of educational bureau, so far as you are concerned?

A. I am not the teacher in that, I am one that learns.

1356 Q. When did you cease being teacher in the University?

A. On the 1st of July, 1913, I was given a year's leave of absence on full pay and devoted my entire time——

Q. I didn't ask you that.

Mr. Palmer: Make your answer.

Mr. Boutelle:

Q. I asked you when you ceased teaching in the University.

A. July, 1913.

Q. Did you resign or were you let out?

A. I was given a year's absence on full pay and before the end of the expiration of my term I was engaged in other work.

Q. Then you resigned?

A. No, sir.

Q. How did you happen to leave?

A. Well, my term of office expired as assistant professor.

Q. You were not reinstated or reappointed?

A. I was not reappointed, yes.

Q. During this time you have spent a good deal of your time in reading well records, haven't you?

A. No, sir, not all of the time.

Q. You have during the time I have been speaking of?

A. I have at some times studied well records, yes, sir.

Q. Haven't you made the statement that you have done very extensive work in reading the well records in Minnesota?

A. Whether I made the statement or not, I made a very intensive study of well conditions in Grant and Stevens County——

Q. I didn't ask you that question.

A. —that was a very intensive piece of work, if it was original.

Q. Did I ask you such question as that?

A. I thought you did.

Mr. Palmer: Make you- answer as you please.

Mr. Boutelle: If you will kindly listen to my questions we will proceed very much faster. Read the question.

1357 (Question is read by reporter.)

A. Whether I made the statement of not it is true that I have.

Q. You have been the engineer, I take it, in charge of a number of large reclamation projects?

A. Not at all.

Q. And have laid out, as engineer, large drainage systems?

A. No, sir.

Q. Or have supervised the construction of large drainage systems?

A. No, I am not——

Q. Just answer the question?

A. No.

Q. If you have not been engineer or supervised the laying out or the construction of large drainage systems, have you supervised or laid out the construction of small drainage systems?

A. No, sir.

Q. You have been extensibly engaged in various branches of hydraulic work for different private concerns as engineer?

A. Not under their pay I haven't been.

Q. You have been extensively engaged in large hydraulic projects for different concerns?

A. I was engaged by the Northwestern Railroad company to study every well which they had in the State of Minnesota and have been consulted for the last 25 years on various matters regarding pools, drainage, etc., but I have never charged for that information.

Q. I didn't ask you whether you have charged for the information, I presume the fact you didn't charge shows the value of the information in your estimation.

A. I am not at liberty as United States geologist and I was not at liberty as a professor in the University to make charges.

Q. I didn't ask you whether you had or had not charged. I want to find out what engineering work in the field, hydraulic engineering work of any magnitude you have done, and by that question I mean where you have been either the engineer in charge or one of the engineers in charge?

1358 A. The truth is I am a consulting geologist and not a civil engineer.

Q. The truth is you know practically nothing from a practical

standpoint and from the standpoint of experience about engineering and hydraulic matters, isn't it?

A. No, that is not true.

Q. If it isn't true tell me what practical engineering experience you have had in the way of hydraulic construction, planning or construction?

A. Well, the engineers come to me from time to time to lay out their plans and have consulted me regarding geological features relative to those plans.

Q. I didn't ask you about geological features, I asked you about the engineering features, hydraulic features, and I want you to tell me a single instance in your career where you have been in charge of or have supervised the laying out or construction of a hydraulic proposition, tell me one.

A. I have never done that.

Q. You have never done that at all?

A. No, sir.

Q. So that, when you come into this proceeding and pose here as an engineer giving your opinion on practical construction and so on and so forth, the knowledge is largely theoretical upon which it is based?

A. No, sir.

Q. Well, then tell me the practical knowledge?

A. A knowledge of geology is based upon a correct understanding——

Q. I am not asking you, Professor Sardeson, or Mr. Sardeson, about your knowledge of geology, I am asking you about hydraulics. Do you know any distinction between hydraulics and geology?

A. Very little. The science of geology is based upon a correct knowledge of erosion and deposition, and one couldn't be a practical geologist without have a practical and very clear knowledge of the way in which water acts, both in removing and in carrying and in depositing materials, and a knowledge of the streams and their action, both glacial and nonglacial.

Q. Then from your answer to that question I understand you to say—if I am incorrect, correct me—that a geologist is a practical engineer?

A. He is the man to whom a practical hydraulic engineer goes for consultation regarding the action of streams.

1359 Q. Will you kindly answer the question? Repeat the question.

A. He should be.

Q. Follows the same lines of study?

A. So far as the land is concerned, he should.

Q. You- idea of hydraulics is that it pertains chiefly to lands, is it?

A. No, the word hydor means water.

Q. When did you first visit the area with which we are dealing?

A. To make a detailed study of it I visited the first time in 1912, I think, on the 2nd of July.

Q. Where were you during that time?

A. I was during the month of July in the Herman quadrangle and in the Barrett quadrangle.

Q. Where is that with reference to the location *wich* which we are dealing?

A. It is in the east part of the Mustinka basin.

Q. And where, for instance, with reference to the Great Northern crossing, Norcross, for instance?

A. Herman and Norcross lie in that area.

Q. How far west did you go?

A. I came within about a quarter of a mile officially of the west boundary of Grant county, but of course I was at liberty and did make excursions out to the westward to get my bearings better.

Q. When you say you were at liberty, you were not in confinement, were you?

A. My commission gave me the right to make observations outside of my particular district.

Q. What I am trying to find out is where you went with reference to this area?

A. I went out every part in detail of the Herman and the Barrett quadrangles. The Herman quadrangle is in evidence in this case.

Q. And that was in what year?

A. 1912.

Q. What were you doing?

A. I was making a folio for the United States Geological Survey and in order to do that I examined the soil, the geological
1360 formation of the surface and underground and obtained knowledge as to the drainage, the number of swamps and their relations and also got the history or records of each well of which I could obtain records.

Q. How long were you there?

A. Two months.

Q. When did you next see the region?

A. The fall in 1917, September.

Q. How long were you on the ground this fall?

A. Four days.

Q. Were you ever in this region during a period of what we have described here as flood?

A. No.

Q. So that, when you were speaking about flood conditions, overflow water and things of that kind, you don't pretend to speak from actual observations?

A. No actual observations of the flood waters.

Q. This Agassiz Glacier that you have given us extremely valued monogram on——

A. Glacial Lake Agassiz.

Q. Can you give us an approximation as to the time that was in commission?

A. That has been determined from the study of the recession of

St. Anthony Falls from the position of the court-house of St. Paul to its present position in Minneapolis——

Q. I have no doubt it has been studied; I was trying to get an approximation as to the time.

A. I was the party commissioned to make the final revision of that study and it is about 8,000 years ago that the outlet of Lake Agassiz ceased to be operative as the River Warren.

Q. 8,000 years ago?

A. That is the estimate.

Q. And are we correct in assuming that this River Warren, that we have had such interesting information in regard to, was about contemporaneous with that?

A. The River Warren flowed from the outlet of Lake Agassiz to St. Paul and the old capitol stands on part of the original floor of the river.

Q. Did it stand there at the time the river was flowing?

A. It stands there now.

1361 Q. The river does not?

A. Except in spirit.

Q. You told us something about the conditions of Lake Traverse from a geological standpoint and if I understood you correct you determined from the geological formations that Lake Traverse at one time occupied a very much larger area than it does now, is that right?

A. It never occupied a much larger area than it does now at flood stages.

Q. Didn't I understand you to say at one time the whole Bois de Sioux valley was a part of the lake bottom?

A. No, I said that the lake extended up to the divide in the neighborhood of White Rock and then there was another ponded condition from White Rock to the mouth of the Rabbit river. The two lakes originally discharged in different directions but finally through the overflow of the Lake Traverse northward they were joined together by some kind of a channel.

Q. About how long, according to this scholastic information of which we are getting the benefit, do you consider they were together?

A. I don't know.

Q. Well, approximately?

A. Without making a detailed study of the region I wouldn't wish to say.

Q. Was it in 1915 and 1916?

A. Presumably not.

Q. Well, was it as late as 1800?

A. Of course, in high stages of flood the original condition probably recurs now, but progressively from this time backward for some 4,000 years, the amount of low water has been decreasing.

Q. Well then, are we right in assuming that for 100 years or so Lake Traverse has been generally as it exists to-day?

A. Practically the same as it is to-day.

(At this time recess is taken until 1:30 p. m., October 3, 1917.)

1362 October 3, 1917—2 p. m.

Hearing resumed pursuant to adjournment with all parties present.

Cross-examination of FREDERICK WM. SARDISON, continued.

By Mr. Boutelle:

Q. Then if I understand you correctly, so far as geological conditions are concerned, the formation which now exists in Lake Traverse and the Bois des Sioux valley has been there for a great many years?

A. The main part of it, yes sir.

Q. Well, what part of it has not been there for many years?

A. Well, there is some increase in delta deposits besides, of course, the artificial construction.

Q. I spoke to you about geological condition and not articicial construction. Is there any way that you can state to us or any information that you have that will show any appreciable change in these so-called delta formations during a series of the last twenty years?

A. Well, I observed one place where, by ditching, they had changed the course of the outlet of the stream acrossed the delta. That of course will have an effect which we call geological in throwing accumulations of materials in a new direction, and no doubt if I had taken notes on that I could mention a number of cases where the artificial changes in the valley are having a geological effect.

Q. How do you want to leave it—that the geological conditions that exist so far as that lake is concerned and the valley have been substantially the same for many years or that they haven't?

A. Substantially the same for a long time.

Q. Now, based upon this extensive engineering experience which you have detailed, I understood you to express the opinion that the gridiron ditch construction in this region with which we are dealing was incorrect?

A. If its single object is to remove water from the land as rapidly as possible it is not entirely correct. There is, however, a complex of objects comprised in that system of ditches. The first is good drainage for the flood onto section lines; the second is to make reservoirs for catching the water; and the third is to deliver it at least as well as it was delivered in a state of nature.

1363 Q. Are you giving us your inferences, or do you know the ditches were constructed for reservoir purposes?

A. I know that they are.

Q. You know these ditches were constructed to create reservoirs?

A. Some of the ditches in that system I am intimately acquainted with and know that they serve as a reservoir rather than for the delivery of water.

Q. That is not my question? I asked you whether those ditches were constructed for carrying the water off the land or for reservoir purposes?

A. Both.

Q. And you still adhere to your opinion that the system adopted there, so far as discharging the waters is concerned, was wrongly conceived?

A. Oh, I won't say it was wrong, but it is not conceived solely for the purpose of discharging waters as rapidly as possible, which is usually assumed to be the function of a ditch.

Q. If the plan of construction in that region was conceived with a view to discharging waters from the land you adhere to your original opinion that the plan was incorrect, do you?

A. I adhere to the opinion that the plan is not the best that could have been adopted.

Q. And you also stated, as I understand, that the original Mustinka ditch, as we have termed it, was not correctly conceived for the same reason?

A. For the same reason, yes sir.

Q. And the reason, as I understood you to say, was that these ditches cross the flood plain at right angles. Is that right?

A. I don't understand which ditches you mean.

Q. I mean the whole system?

A. No, they keep as far as possible upon the section lines, whether that is right angles or not.

Q. What is the natural flow of the water at that point as shown by the stream?

A. The total drainage is in a northwesterly direction above the big ben-.

Q. What do you mean by the big bend?

A. The part of the Mustinka river that is cut-off by the new Mustinka ditch.

1364 Q. Well then, it is correct to say, substantially, is it not that your opinion with reference to this ditch construction is based on the circumstance that the ditches do not follow the natural line of flow but do cross the natural line of flow, or what you have described as the flood plain substantially at right angles?

Mr. Palmer: Objected to as the witness has not described that area as a flood plain at any time.

A. To the first half of the question I should say yes, and to the second half I should say no.

Q. Professor Sardison, as you examined this construction on the ground did you find that the original Mustinka state ditch intersected the natural channel of the Mustinka river on the east?

A. It begins from the channel of the Mustinka river.

Q. Did you make an examination at that point?

A. I did some years ago.

Q. But not recently?

A. Well, about a quarter of a mile from it.

Q. Well, did you examine it some years ago sufficiently so you can state now whether the ditch connected with the old Mustinka channel?

A. Yes, the ditch connected with the old water channel of the

Mustinka and disconnected from the flood plain so that the situation is about the same as holding a neck of a bottle under a pump spout in flood times. The flood spilled out to the right and left before going into the ditch.

Q. What did it do before the ditch was constructed?

A. I suppose it did just about the same.

Q. Now did you make a sufficient examination three or four years ago so that you could tell us the relative size of the natural channel at the neck of the bottle here and west of that point as compared with the old Mustinka ditch?

A. The old channel at Norcross and above Norcross was 20 feet wide at that time.

Q. I am speaking about the channel to the west?

A. I saw those remaining parts of the old channel on this visit in September of this year.

Q. And what will you say, if you made a sufficient examination as to the relative size of the old channel as compared with the ditch?

1365 A. I made sufficient examinations to show me that the ditch itself has no uniform capacity at the present time, but assuming the capacity at the present time, but assuming the capacity as approximately uniform, I think the old channel carried the water better than the new ditch itself in its present state. The reason for coming to that conclusion is that the old channel was a natural construction and the new ditch is being eroded in various ways by the stream in an effort to adapt itself to the new course, showing that the channel does not fit the stream.

Q. Calling your attention to the map, marked Defendant's Exhibit No. 4, and purporting to show the line of the old channel through sections 10-24-23 and 15, what is indicated by the tortuous course followed by that channel?

A. That indicates that the load which the stream was carrying was in excess of the power relatively, and therefore it meandered.

Q. It doesn't indicate the case of an illy defined channel, creeping along through a flat, level area with a sluggish flow insufficient to erode a definite channel?

A. Nothing of that kind appears on the map that I can see.

Q. Did you examine it sufficiently to see that it did not appear upon the ground?

A. I examined the channel and saw that there was a definite, well-defined channel, but that the banks were low.

Q. Did you examine the old channel sufficiently to see that there were places all along the line of this cut-off ditch where there were practically no banks?

A. I did not get the impression from what I saw that there was any place along the course where the river at normal stages was not within its banks.

Q. I didn't ask you that question, Mr. Sardison?

A. I examined it sufficiently to satisfy myself that there had been banks through the entire course sufficient to confine the river into a channel or into a divided channel. I think at one part its course

it had divided, having alternative channels through the lowest part of the Redpath sloughs.

Q. Is that the way you want to leave your answer?

A. I think so.

Q. You state that according to your observations this natural channel which you found here was sufficient to carry the water at normal stages. Is that right?

A. So far as I can see from the new abandoned channel that was the case.

1366 Q. What do you mean by normal stages?

A. When the Mustinka river was flowing twenty feet wide within its banks at Norcross.

Q. And what would that represent in second feet of flow?

A. I don't know.

Q. What would happen in case of a volume of water going through the old channel of the Mustinka at this point when that was exceeded?

A. It happened the same there as all along the Mustinka, that the water went out of the normal channel on to the flood plain. The flood plain in that strip which you have designated by your questions was very wide and flat.

Q. How far did it go?

A. The flood plain continued at least a mile wide as far down as to a point opposite the lower end of the present cut-off ditch and then narrowed gradually down to a quarter of a mile wide at a point two miles southwest of Wheaton.

Q. The volume of water that came through the Mustinka channel would not have any bearing upon the area of this flood plain?

A. The flood plain is a structural flood plain and it might or might not be entirely filled.

Q. Well, now suppose we get away from the technical terms of flood plains and speak about overflow in the natural condition. Could you tell us as to the extent of the overflow without either having seen it or knowing the volume of water that came down there?

A. I was able to see what the extent of the overflow was by the wave marks on the embankment along the ditch indicating that the flood went over the top of the ditch embankment in its lower part. I was also able along the roadways and artificial ditches to find accumulations of small pebbles, resulting from wave wash at the time when the flood was high and streams were able to create disturbances on the banks of the flood plain at that time. And I think that is sufficient evidence to indicate to me conclusively what the extent of the flood plain is.

Q. That is, these deposits that you find, without having seen the region in a condition of flood or knowing any about the volume of water or the velocity of the flow, would enable you to tell the extent of the overflow, would it?

1367 A. I could trace the border of an overflow area along the valley the same as you could trace the tracks of a man walking in the mud. The stream leaves its mark there and those marks can be recognized.

Q. Would that follow in case of a temporary overflow?

A. No, it requires an habitual or successive overflows to make a strong mark.

Q. Suppose we had a periodic overflow in what we call the sp-ing freshets, would those geological evidences be likely to be left?

A. The structutal flood plain would be left, I think.

Q. What do you mean by structural flood plain?

A. An area along the river which is defined as the flood plain channel the same as the normal channel is defined as the course of the normal stream. They are both structural.

Q. Do you mean to tell me that on such information as you have given here that you can indicate to us anything more than a guess as to the extent which these waters overflooded this region?

A. I think on most regions I can tell.

Q. I didn't ask you about that?

A. Yes, I think I could.

Q. Is it anything more than a guess—you never saw it?

A. I have been in the valley and I have seen the structural margin of the flood plain.

Q. In what valley?

A. The Mustinka valley.

Q. I thought we were dealing with what you have described as a perfectly level area in there?

A. The Redpath sloughs is what I described as a level area.

Q. I am dealing, Professor Sardison, with this entire area in here, that is gridironed by these ditches?

A. I didn't understand you. That area is smooth but it is not level.

Q. What do you mean by its not being level?

A. It slopes.

Q. How much does it slope?

A. Somewhere in the neighborhood of five feet to the mile.

1368 Q. How much is that to 100 feet?

A. I think it is about 1⅛ inches.

Q. And that, according to your former answer, you regard as a rather precipitous contour?

A. For a smooth surface that is a good fair fall.

Q. Now I come back again to the original question. I asked you a few moments ago—do you undertake, without ever having seen that area in a period of flood and with no knowledge of the volume of water going through the old Mustinka in times of freshet or flood, to say the extent to which that was overflowed?

A. In the first place I have seen enough of the area to be able to judge *to* whole area, and I have observed that the whole area with the exception of the Redpath sloughs is one on which there are erosions from the surface instead of deposit upon the surface. If it was an overflowed surface there would be deposits there to distinguish it, and the vegetation also would show that it is an overflowed surface, that is, vegetation would if it was overflowed.

Q. What do you mean by overflowed? Permanently overflowed?

A. The flowing of water on to land for some period of time sufficient to damage vegetation.

Q. Well, isn't it true and might it not be true that we would have periods of overflow of lesser duration than that where the water would run off?

A. When it rains the water——

Q. I didn't ask you about rain.

A. The water has to collect off the surface and there being no obstacle in the way of its flow it preceeds, as a matter of course, to run down hill towards the rivers, and there is no reason that I know of for supposing that it doesn't.

(Question repeated.)

Q. Is that the way you want to leave your answer?

A. Yes, sir.

Q. Now then I come back to my original question, Prof. Sardisen, and ask you if there is any way that you could determine, without having seen the area of overflow and knowing nothing about the volume that flowed through the old Mustinka, as to the extend to which these overflows, periodic or otherwise, would extend?

A. Why, if I have never seen the region of course I wouldn't know anything about it, if that is a part of your question.

1369 Q. You looked at this map, Defendant's Exhibit 7?

A. Yes, sir.

Q. And you have been on the ground?

A. Yes, sir, I have been acrossed there.

Q. The heavy black lines following the section lines east and west on the section lines represent ditch construction, don't they?

A. Yes.

Q. Is it your idea that these dithches were put in there to irrigate the land?

A. I never heard of any irrigation ditches in that country.

Q. Well, what is your theory, from what you observed, that these ditches were put in there for?

A. They were put in there for the purpose of diverting drainage from its direction across the flats on to the section lines, and of gathering and reservoiring the water from the floods so far as the ditch capacity will do so, and for delivering that water at least as well as it was delivered in a state of nature.

Q. Where did the water come from?

A. Off from the adjacent lands.

Q. And your idea is, Prof. Sardison, that all of this ditch construction here in this gridironed region, and including the original and extended Mustinka ditch, was to take care of the water that came off from the adjacent lands?

A. Yes.

Q. And it had no reference to a-y water that was brought on tot those lands by the Mustinka river or its tributaries?

A. I didn't designate in my answer how the water got there on the lands.

Q. I asked you that question?

A. The dit-hes are put in there to reservoir the water and carry it off no matter where it came from.

Q. I asked you where the water came from?
A. Off the adjacent lands.
Q. How did it get on there?
A. Some rained on there and some ran on.
1370 Q. Where did it run from?
A. In some cases it might have come as overflow from flood streams.
Q. Where?
A. From flood streams.
Q. From what streams?
A. Along the flood plain of the Mustinka river such ditches as I have seen in the flood plain don't carry off the flood waters, they simply become practically without capacity, or simply as partial obstructions in the flood plain during the time the flood waters are passing through. The cut-off ditch which goes outside of the flood plain was very obviously intended to divert the water acrossed from one side of the channel to the other. If it was intended to divert the flood waters it should have been larger.
Q. Is that your answer to the question?
A. Yes, sir.
Q. Do you know of any other streams of any magnitude in this area to which I have been directing your attention, than those that are shown on this map?
A. Why, that map shows only a part of the drainage ramifications of that whole area. It doesn't even show all of the ditches I have seen there.
Q. I didn't ask you about that. Is there any appreciable, natural drainage in the form of channel that doesn't constitute a tributary to the streams that are here shown?
A. I couldn't say as to that. In some parts there are certainly little basins which don't overflow, at least ordinarily, but in this very flat country I should expect that practically all of it was originally tributary to the streams, and practically all of it was connected by slight courses, either directly distinguishable by channels that are distinguishable when the land is dry or by courses that would be apparent when the water was on the land, connecting with the streams shown on the map.
Q. Then I ask you again where the waters on the land come from?
A. Some of it rained onto the lands and some ran onto it from neighboring lands.
Q. Is that all the way it got on?
A. If you mean by back-water, I don't think it did. All of the flood waters I know about in there were on there in a state of nature towards the mouth of the Mustinka.
1371 Q. You never saw this land in time of flood?
A. No, sir.
Q. Now why do you so assiduously avoid, in answering my questions, the possibility of overflow from these streams, including the Mustinka river?
A. Simply because I can't see how it is possible that that area was overflowed.

Q. Did I ask you any such question as that?

A. I think you did.

Q. Now I come back to the same question, and I want you to tell me what your conception of all of that gridiron ditch construction in that area is?

A. Outside of the Redpath sloughs my conception of that gridiron area is a smooth surface on which the drainage in a state of nature was very easy, and which is now very easily drained artificially, and because it is so easily improved by drainage that that is the primary reason why there are so many ditches there.

Q. In other words, if I understand you correctly, it was because this area was so easily drained naturally that this entire system of ditch construction was put in there?

A. That was one of the large factors in the making of that system.

Q. Now you told us something about the roads in North and South Dakota. Do you know how long those roads had been there?

A. No, sir.

Q. Is it your conception that those roads acted differently in the time in question from that they have acted in the past?

A. I don't know why they should.

Q. So far as flooding conditions are concerned those roads would presumably play substantially the same part under the conditions we are dealing with as on previous occasions?

A. Under the same volume of water.

Q. Now you spoke about a certain amount of damming effect that these roads produced. If your theory is correct in that regard the east and west roads would be a certain source of protection to the lands to the north, wouldn't they?

A. No, sir.

Q. In other words, if the water was entirely dammed off from the lands to the north the lands to the north would not be protected?

1372 A. Not if the dam broke.

Q. Did I ask you anything about a dam breaking?

A. Yes sir.

Q. Now we will take what you have described as the White Rock road—do you know anything about the level of the flood of 1915 and 1916?

A. No sir, except what I have been told and seen.

Q. Did you ever take any elevations on the White Rock road?

A. No sir.

Q. Do you know as to whether or not that White Rock road at its easterly end near the village of White Rock was considerably lower than it was further west?

A. I didn't look to see whether it was or not.

Q. You didn't care?

A. I did care, but I didn't have the time or means for determining.

Q. You were looking for conditions that would prove something artificial that would help these floods. That is the fact, wasn't it?

A. No sir, I am entirely impartial in this matter.

Q. When you went out there on the ground in whose employ were you?

A. I was sent there by the State's Attorney of Minnesota.

Q. And for the purpose of making examinations relative to this case?

A. No, sir, for the purpose of making examinations with reference to the truth of the situation.

Q. You knew nothing about the case?

A. I have heard of it and had read the complaint, yes sir.

Q. So you understood in a general way when you went out there what the issues were, did you?

A. Yes sir.

Q. And you expected to be called as a witness for the defense?

A. No sir, I was employed for four days.

Q. You thought they would send you out there simply to give you a vacation?

A. No sir, I was paid for my work.

Q. You didn't expect to become a witness in the case?

A. No sir.

1373 Q. You made a report of your investigation, I suppose?

A. Yes.

Q. To the State's Attorney?

A. Or his assistant.

Q. Now if it be true that the profile of the White Rock Road for several hundred feet, more or less, east of White Rock showed that it was very little above the normal level of the waters of the lake this damming proposition would have very little effect, would it?

A. I wouldn't say that.

Q. In other words, if the water had a free course of flow right over the highway you would still think it would operate as a dam?

A. No, if it had free flow east of White Rock I would say that the Bois de Sioux at that point was not obstructed. If it was free it wasn't obstructed.

Q. Then my question is, under those circumstances this damming theory you have worked up doesn't amount to much?

A. I didn't work up any damming theory, but I must recognize the face that the flow is west of White Rock instead of east, very largely.

Q. Did you examine the road at other points?

A. I couldn't help but do that. I drove along it.

Q. Did you take any measurements or profiles?

A. No sir.

Q. Any measurements of the water levels?

A. No sir.

Q. Can you tell us the level of that road as compared with the normal mean waters of Lake Traverse?

A. No sir.

Q. Now you found some other roads east and west up to the north, as I understand you?

A. One north and south?

Q. I haven't got to that—you found some east and west roads?
A. Yes sir.
Q. Do you know how long they had been there?
A. Well, since before the flood.
1374 Q. Do you mean Noah's flood?
A. When I speak of the flood I mean this one.
Q. We had two floods?
A. The floods of 1914, 1915 and 1916.
Q. Well, how many years before that?
A. Well, one of the roads looked real new, and fresh, as if it had been constructed not long prior to the time of the floods under consideration. It might even have been rebuilt in part in intervals between the floods. It looked very new. The others looked rather old.
Q. When did you see them?
A. 1917, in September.
Q. Was this change in the construction of this one road that you have referred to new road building or improvement of an old road?
A. I couldn't tell as to that. There was a nice looking grade—a turnpike road.
Q. Now as a matter of fact you don't know whether those roads have been there ten years or twenty years or twenty-five years, do you?
A. No sir.
Q. And that same thing holds good as to both North and South Dakota—you don't know anything about the time the roads have been there, do you?
A. No, I don't know.
Q. Now that we may not get a misunderstanding into this case, you testified to the glacial action in forming these lands north of Lake Traverse and up through the Bios de Sioux valley, and to the fact that on the surface of the glacial drift there was a deposit of silt, I am right in that am I not?
A. On the surface of the bottom of the old river Warren there was a silty deposit perceptible at various places over the plain.
Q. About how long do you think that deposit of silt has been going on?
A. Well, to be frank with you, I thought that it was the deposit of floods and that it had been made in the last few thousand years.
Q. So that so far as the glacial part of this proposition is concerned through this area it is something that dates back a few thousand years, its't it?
A. Yes sir.
1375 Q. And *for* a practical standpoint to-day we are dealing with the land as it is with a deposit of silt to what depth?
A. Oh, usually on unplowed land I should estimate it at less than the depth of the plow—a few inches.
Q. Do I understand you to testify in this case that it is your opinion that the silt loam deposit in this area of the Bois de Sioux valley is less than the depth of the plow?
A. In many places where I have seen it, yes.

Q. How many places did you examine the depth of it?

A. I couldn't tell you, but I noticed it here and there when we went along.

Q. What do you mean by here and there?

A. I watched for boulders and I watched for any broken places in the ground where the farmers were plowing under cat-tails and where they were plowing fields, that didn't have cat-tails, and any good opportunity to gain an understanding of the nature of the ground. I observed, you might say, every fourth or fifth place and would say apparently in all of it there was a deposit in addition to what the river Warren had originally left there. My reason for thinking it was there was because I saw it in some cases lying over the boulders, the tops of boulders, and in a way which would not have been left there by the glacial river.

Q. Where was this plowing under of cat-tails going on—through how much of that area?

A. Well, I didn't make any estimate, but there were a number of large fields being plowed while I was there.

Q. Cat-tails being plowed under?

A. Yes sir.

Q. All the way up and down the valley?

A. Yes sir.

Q. How far?

A. Up towards Fairmount and along down somewhat near to the Bois des Sioux channel they were plowing fields, to the northeast of Blackmere especially.

Q. I am asking you, understand, in regard to conditions down through that Bois des Sioux valley from the outlet of Lake Traverse up. Now I understand you to say that you observed these
1376 geological conditions at various intervals and this superficial deposit of silt, and the places where you observed it were places where you had the opportunity because the farmers were plowing under cat-tails and so forth—am I right?

A. Gopher burrows and rat burrows and any sort of breaking up of the ground was examined and, as I said before, we went along places where they were plowing with a view to seeing what the ground was.

Q. Then you didn't mean to tell us about the plowing under those cat-tails?

A. Yes, I will tell you all about the cat-tails as far as I know it.

Q. Well, where did you see them plowing under cat-tails in the Bois des Sioux valley?

A. To the southeast of Fairmount and northeast of Blackmere especially.

Q. How far down the valley between Fairmount and the South Dakota line?

A. I don't remember. I don't recall now if I saw them plowing under cat-tails anywhere south of the road that runs east of Blackmere. Yes, they were plowing a field that was on the south of the road that runs east of Blackmere too. But there were cat-tails from

White Rock all the way to the road running east from Fairmount either standing or plowed under.

Q. Now this purely superficial silt deposit which your geological wisdom located in that region must have produced a very unfertile character of land, must it not?

A. No, that is the very essence of fertility.

Q. Six inches of silt that doesn't go down the depth of the plow?

A. That is the average depth I gave you. Of course that silt that has floated upon the land is a great benefit to the land in the long run because it is the very essence of fertility from the other lands.

Q. Do you consider glacial drift, as a general rule, very fertile soil?

A. Yes sir.

Q. Was that the character of this soil?

A. No, it is rather finer material, better materials of the soil which were washed off of the plowed fields during times of rain.

Q. So that the accumulation, viewed from this geological standpoint, with which we are dealing, would indicate a very fertile area there?

1377 A. Yes, I think that is very good land.

Q. And you have no reason to doubt that that was so for some hundred years?

A. No, I think it was in a state of nature, so far as fertility is concerned, very good land.

Q. Well, you don't know of any time within your personal observation when it was not in a state of nature, do you?

A. Well, I just testified that some of the lands were being plowed.

Q. You consider their being plowed not in a state of nature?

A. That is the distinction I had in mind.

Q. Now you have told us something about an area lying north and a little east of Norcross. I understand from your testimony that that is a smooth, level area there, this area shown on Defendant's Exhibit 7, indicated inside the blue dotted lines?

A. The south half of the town of Gordon, near Norcross lies within that area, and is a rather smooth, level piece of land. In the town of Delaware all except the extreme northwest corner is a less level area, but it is what would be described as a gently rolling land, except a small strip*t* along the upper Mustinka river from Section 22, town of Delaware, northward, is distinctly morainic. That is, there are little knolls of glacial drift dropped down here and there in more or less of het-rogeneous way, giving the land something of a rolling appearance.

Q. What do you mean by rolling appearance. Is it abrupt or is it smooth, rolling prairie?

A. What I usually call rolling land is where as soon as you go down one hill you have to go up another, or where as soon as you go down one knoll you have to go up another.

Q. Well, that may be true of the Alps?

A. That is broken. You don't get down the Alps and up again so easily.

Q. Is that a rough—the northern part of that area—broken hilly area, or not?

A. It is not a rough, broken, hilly area.

Q. Comparatively relatively smooth?

A. Yes, relatively smooth.

1378 Q. And it's elevation as compared with the land to the west?

A. It rises, excepting for the Mustinka valley which goes across it, it rises quite steadily towards the northeast beyond the dotted boundaries on the map and in fact beyond the Pomme de Terre river.

Q. And there is nothing substantially different between that area and that which lies to the west?

A. Excepting that of course westward and northward of the Herman beach there is the lake deposit condition of the glacial drift, or water deposited condition of the glacial drift, giving it a smoothness in fact as well as in appearance which the other plan does not have to such a degree.

Q. Now just for a moment I want to go back to this original Mustinka ditch. What was the size of that ditch as you recall it?

A. I don't remember just the exact size of it now. The original size is not apparent in its present condition.

Q. Was it banked to the north or south?

A. The embankments were thrown both north and south, but I think probably a little more to the north than to the south through part of the district.

Q. What was it's depth?

A. I don't know.

Q. What was it's depth as compared with the original channel of the Mustinka river which it succeeded?

A. Where it crossed the meanders of the Mustinka river it was doubtless two feet deeper.

Q. Now, if I understand you correctly, Professor Sardeson, assuming that we had an overflow of the old Mustinka channel in the area traversed by this original Mustinka ditch and that ditch was cut through there several feet deeper than the old channel but with a larger capacity than the old channel, that is would not have a tendency to accumulate those overflow waters. Was that your testimony?

A. Well, in time of flood through that part of the ditch the flood comes up to the top of the embankment on both sides, or practically to the top of the embankment on both sides of the ditch. For that reason there is no increase in the volume or capacity in the valley

1379 because the dirt that was taken out of the ditch is left up on the bank, and when both are inundated the capacity of the valley is no greater than before, but in low stages of the water it should have been greater than before if the ditch was properly constructed, barring the fact of course that that delivered the water more than one and one-half miles upstream from the main channel of Twelve Mile creek above where it was delivered before, thus losing some advantage in that.

Q. Now will you kindly listen to the question. I will frame it in a little different manner. Assuming that in a state of nature we had an overflow condition of the original Mustinka in the area tra-

versed by this original Mustinka ditch, and that ditch was put in through that overflow area with greater capacity and deeper than the original channel, your testimony is that it wouldn't have a tendency to accumulate the overflow waters. Is that right?

A. If it carried the waters faster than the old channel it would accumulate the waters down on Twelve Mile creek where it discharged into Twelve Mile creek, and if it didn't carry the water faster than in a state of nature it would accumulate the waters in the upper or east end of the ditch. I don't know which is the case,

Q. Is that the best answer you can make to that question?

A. Yes sir.

Q. As I understand, still applying this extended engineering experience, your testimony is that a ditch ceases to function when it overflows. Is that right?

A. It might and might not. It depends on its relation to the flood plain and the course of the stream, and the manner in which the ditch is constructed.

Q. You don't know, and never saw this ditch in a time of flood to know what effect it had upon the waters in that region?

A. I saw the flood marks on the embankments in the ditch, and I think I know how the flood acted there.

Q. You think the water rose to certain heights because it appeared upon the banks of the ditch?

A. Yes.

Q. Well, that is not what I am asking you. I am asking you if you know what the effect of that ditch was in caring for the flood waters after it was constructed?

1380 A. My best judgment is that the ditch was never any use; that it didn't serve the purpose to control or carry the flood waters, for the simple reason that in the time of floods both the ditch and embankment were submerged. An amount of earth taken out of the channel and put upon the bank doesn't increase the capacity of the valley if the earth removed is left to obstruct the flow of the water just as much as the place where it is taken out increases the flow.

Q. And the slope of the water or its level wouldn't have any bearing on the question?

A. So far as that is concerned, digging the ditch deeper at its head and discharging it farther up-stream on Twelve Mile creek tended to lose fall in the distance of discharging.

Q. Why did it ?

A. That put the ditch two feet lower where they began it and there they lost two feet at one jump.

Q. Where was it at the end?

A. It was on Twelve Mile creek upstream from where it would have flowed into the river in a state of nature.

Q. Well, what was the level of the bottom of the ditch as compared with it's easterly end?

A. Well any depth of the ditch below Twelve Mile creek——

Q. I am not asking you about below Twelve Mile creek. You don't know, do you?

A. The bottom of the ditch is not there now, and I don't know where it was except as I can see its relation to where it comes with Five Mile Creek and where it comes with the old channel, and they seem to have deepened it somewhat in one part and somewhat more in the other part.

Q. There is no bottom to that ditch now?

A. Not to the ditch. There is to the natural channel.

Q. The ditch is bottomless at the present time?

A. The bottom has been knocked out of the ditch and there is a natural channel that has tried to take its place.

Q. Is the natural channel deeper than the bottom of the ditch, as it was originally?

A. Yes.

1381 Q. If we give the ditch a natural channel in there we have a deeper receptiacle for water than under the artificial conditions?

A. Yes, I think it is deeper than it was in a state of nature.

Q. Now what is the general level of that ditch between the upper end and the lower end, if you know, and if you don't say so?

A. I don't think I can state any further than I have already done so.

Q. Well, you haven't stated. Do you know?

A. I don't know the exact number of feet difference between the upper and lower end.

Q. From the circumstance that, as you have observed, this ditch there has been a new channel cut in the bottom of the ditch, deepening that which was left there by the ditch contractors, would you draw the inference that water had run in that channel at some time?

A. I saw it running there.

Q. So there is no question in this case, but that it did carry water?

A. It is carrying the Mustinka river at its normal stage.

Q. And nothing more?

A. Oh, it will carry some flood.

Q. How many second feet do you estimate that ditch would carry?

A. I don't know the velocity and the cross-section of the ditch in such a way as to be able to answer your question.

Q. You can't give us any idea, can you?

A. Well, I don't think the ditch capacity as a whole is any different from the capacity of the channel of the Mustinka above Norcross.

Q. Did I ask you that?

A. And the capacity is the width of twenty feet with the water flowing possibly two feet deep, giving us a cross-section of about forty square feet.

Q. Suppose the water gets up to the elevation of 990 there in this old ditch, what would its capacity be?

A. The map, Exhibit 4 shows the entire length of the ditch to be in land the surface of which is above 990, and if the water only rose as high as 990 it would not be able to get into the ditch at the upper end.

1382 Q. What did you estimate the depth of that ditch bank full would be?

A. The depth is not uniform and the height is not uniform.

Q. Well, approximately?

A. At one place the new ditch would overflow at a rise of two and a half feet an- at another place it wouldn't overflow or rise over the embankment at less than ten feet. It would require a raise of ten feet at least to get over the embankment in certain places.

Q. Now take any place you want there and assume a run-off from that area tributary to that area of three second feet, and estimate your own velocity, and give me the discharging capacity of that ditch. Can you do it?

A. I am not accustomed to making such calculations as an expert and would be able to answer that question in an entirely unprofessional way only.

Q. That is precisely what I have been trying to get you to tell me for the last half hour. You don't know anything about the capacity of that ditch and can't figure it, can you?

A. I don't know whether I could or not at this time.

Q. If you can, do so?

A. I have no accurate measurements of the ditch at any place. I made no such measurements and haven't any at hand. I don't know the cross-section of the ditch.

Q. Could you do it if you had the cross-section?

A. I think I could.

Q. Do you feel certain of it?

A. I have done it.

Q. But you won't pose as an expert on the reliability of your figures after you do it?

A. I have never posed as an expert mathematician.

Q. You don't know anything about the discharging capacity of that ditch so that we can get anything tangible in the way of volume?

A. My professional way of looking at that ditch is to see what has taken place there and not to measure the depth and calculate what might take place in the future.

Q. Your professional work has been to look at that ditch from the standpoint of a geologist?

A. Yes sir.

1383 Q. Now do you think that your estimates of the relative flow and discharge of this ditch as compared with the relative flow and discharge of the Mustinka channel farther down are as reliable as your estimates with reference to the old ditch?

A. I don't remember of having made such an estimate.

Q. If I understood your testimony you undertook in your direct examination to tell us the relative volume of flow carried by the cut-off so-called and carried by Twelve and Five Mile creek?

A. I think I testified as to which was the dominant stream and in which direction the main flood of water went. I didn't give any testimony in second feet as to the capacity of any channel as I recall it.

Q. Then you don't know whether the greater volume of water was carried through the cut-off so-called or around the bend?

A. I think I do.

Q. And is it based on the same character of information that you have given us with regard to the conditions up here in the old ditch?

A. Same general character, yes sir.

Q. What do you figure is the discharging capacity of the cut-off?

A. It varies with the stage of the water.

Q. What do you figure is its maximum discharging capacity?

A. At the head of the ditch, I assumed the size of the ditch and the size of the channel and could see very easily, as I think anyone else could, that the old natural channel has somewhat more and possibly twice as much capacity as the ditch has, and at the lower end of the cut-off where the cut-off joins the old channel I observed that the volume of water coming around the old channel was able to hold dominance over that coming through the cut-off, and therefore was able to determine, I thought conclusively, that it was the stronger current, and as I had no grounds for assuming that the velocity in the old channel was any greater, if as great as that coming through the cut-off ditch, the conclusion was necessarily drawn that the water coming around the bend owed its greater strength to its volume and that the greater volume of water was coming that way.

(Question repeated).

1384 A. That is the way I figured the capacity of the cut-off was from the way in which it appeared to be acting.

Q. What did you figure as the maximum discharge of the cut-off?

A. I didn't figure a cross-section or the second feet of either channel. I merely judged the relative capacity of the two channels.

Q. And you can't tell now the maximum discharging capacity bank full?

A. Except from hearsay.

Q. Now let's follow back here a little bit on this theory of yours. Assuming that we had a well-defined channel in the Twelve Mile creek intersecting the cut-off ditch at the point shown on this Exhibit 7, carrying the volume of water that you assume that it did, what would be the effect of the water coming down from the east toward the west in the balance of the ditch?

A. Why, as I understand from the question, you mean to ask whether these waters coming down from the old Mustinka ditch would in joining the Twelve Mile creek be carried northward with that creek because of the opportunity to go to the northward and the strong current in Twelve Mile creek which intercepted between the outlet of the old ditch and the inlet through the new cut off.

Q. Now just reconcile that with your theory of the Bois des Sioux with the action of the Rabbit river cutting across it?

A. In the case of the Bois des Sioux and Rabbit river, the Rabbit river is the Swift stream and probably carried a greater volume of water at some times and lesser at other times, but always with the greater velocity. In this case Twelve Mile creek is the larger stream, and the cases are not parallel.

Q. Precisely the same facts, but not parallel?

A. No, they are not parallel.

Q. I assume, if you say that Twelve Mile creek was the dominant stream, as you have testified, that it cuts across the other stream at right angles?

A. Yes, sir.

Q. Now I understand you to say that in this case here it would have no appreciable effect on the water coming down from the portion of the ditch to the east?

A. It would undoubtedly have an effect there.

1385 Q. What would be the effect?

A. It would produce some backwater, of course, up the ditch.

Q. Then the same philosophy would hold good there that would hold good at the mouth of the Rabbit where they meet the waters of the Bois des Sioux?

A. As to producing an overflow?

Q. Producing backwater.

A. The only difference is that in this case the channel of Twelve Mile creek and the cut-off are able to take the floods without overflow of any wide area, while at the mouth of the Bois des Sioux there is a wide overflow to be taken into consideration.

Q. Where have you got the mouth of the Bois des Sioux?

A. I mean at the junction of the Bois des Sioux with the Rabbit river.

Q. Now what do you say the difference is between the action of this predominant stream cutting across at right angles to the waters coming down from the easterly portion of the ditch and the section of the Rabbit river on the waters of the Bois des Sioux?

A. I don't know how much water does come down that ditch and can't make any accurate statement regarding what does take place there. It has been testified to that part of Five Mile creek has been already diverted to Twelve Mile creek and joined that above, and also been testified to that the waters of the Mustinka river at the time of flood leave the river and go around it's old course down there. Now I don't know how much volume comes down the old Mustinka ditch to join Twelve Mile creek at that point and didn't make any inquiry or any particular observation, but what does come down there simply adds to the volume of Twelve Mile creek and to some extent might add to the volume which goes through the cut-off by reason of the height of the water at that point possibly appreciably. But the case seems to me an entirely different one as to factors as compared to the confluence of the Rabbit river with the Bois des Sioux.

Q. Shall we leave it the-. Professor Sardison, that where water intersects a flowing stream at the mouth of the Rabbit river and where it intersects a flowing stream at the mouth of the old Mustinka state ditch that the physical effects would be diametrically opposite. Shall we leave it that way?

1386 A. That is an ambiguous statement. It sounds ambiguous to me.

Q. What is your answer?

A. The laws of physics apply in both cases. The elements involved in the case of the Rabbit river and the Bois des Sioux river are those two particular streams, and so far as I know the nature of those two streams I was able to describe the effect at the junction of those two streams. Now in this case we have more factors entering and more uncertainty because I don't know just how much water has already joined it before Five Mile creek joins the Mustinka, and also I know in times of flood the water has taken the old course of the Mustinka and that leaves me uncertain as to what volume does enter Twelve Mile creek in time of flood.

Q. Well, suppose it was flowing bank full?

A. In that case I would have to know whether the velocity is equal to that of Twelve Mile creek or not.

Q. Well, your whole assumption has been that the velocity of Twelve Mile creek was that of the dominant stream?

A. It is the dominant stream at that point, and my impression from observation was that in times of very high flood the section of the ditch between Five Mile and Twelve Mile creek- is practically out of commission.

Q. What do you mean by that?

A. I think the water simply stands there more ponded that flowing by reason of the conditions.

Q. And is it limited to the area between Twelve and Five Mile creeks?

A. I don't know.

Q. Well, do you know to what extent it is ponded there?

A. I have already stated to you that the upper Mustinka ditch is a lower water channel, and in time of flood most of the flood goes in another direction and that question involves the junction of the two flood waters which apparently do not meet at that point concerning which you are asking.

Q. If Twelve Mile creek is the dominant stream and has a damming effect, as you have testified, on the waters of this ditch, what would be the result?

A. I didn't say it did have a damming effect there.

1387 Q. Well, does it?

A. It flows across Twelve Mile creek and it left no evidence at the mouth that there is a damming effect in either of the ditches. In fact there is a large excavated pool on Twelve Mile creek into which the old ditch discharges before it reaches Twelve Mile creek.

Q. Then if this ditch has substantially the capacity of Twelve Mile creek at this point and its flow is not interfered with by the crossing of Twelve Mile creek why do you say that Twelve Mile creek is the dominant stream?

A. I judge from the results, and from what I saw that Twelve Mile creek, as a matter of fact maintains its channel at some feet

depth greater that that of either the old Mustinka ditch or the cut-off, and that the course of the floods of Twelve Mile creek goes on to the northward and from that I came—it seems to me—to the inevitable conclusion that the water was flowing that way.

Q. What do you figure the capacity of Twelve Mile creek north of the cut-off ditch, the discharging capacity?

A. I didn't figure its capacity in feet at all.

Q. You don't know?

A. Not from my own measurements, no, sir.

Q. And if you don't know whether there was any interference in the flow between the old ditch and the cut-off by the intersection of Twelve Mile creek you don't know anything in regard to the volume of water in the cut-off, do you?

A. I don't know the volume in the cut-off in cubic feet or second feet.

Q. Or as to its velocity?

A. Yes, its velocity could be determined from the debris lying in the bottom of the ditch and could be judged indirectly in that way.

Q. Now this old channel, you told us about of the old ditch—you spoke about erosion?

A. Yes, sir.

Q. From a geological standpoint what do you understand caused that?

A. The normal creek, not the flood waters.

Q. You don't think the flood waters would cause erosion?

A. No, I think not. In time of flood the ditch is so badly drowned there would be no erosion.

1388 Q. So you still a-here to the proposition that a ditch which is flooded is not functioning?

A. Not under the conditions in which that ditch was flooded.

Q. Your answer would be the deeper the water and the greater the volume of the water in the ditch the less the velocity?

A. I never said that.

Q. Well, if you had a greater velocity why wouldn't you have a greater erosional effect?

A. Water of itself does not erode. It is the materials carried along by the water that does the main part of the work, and other factors enter besides those which implied by your question.

Q. In answer to questions of counsel in respect to the construction of this original ditch you expressed the opinion that it should have been constructed in a different direction from a proper engineering standpoint?

A. I think I did, yes.

Q. And that I assume is based on this extended engineering experience in ditch construction you have testified to?

A. If you will permit me to express an opinion——

Q. I will get to that in a minute. What direction do you assume it should have been constructed?

A. From ditches which I have seen in my lifetime there should

never have been a ditch there at all. They should have proceeded to carry the natural structure of limitations of the flood valley that exists above Norcross down along the river and includes the river, more closely to the original course of the river.

Q. Now these ditches that you express an opinion on as an expert did they have both a beginning and an ending?

A. Yes.

Q. Well, this ditch that you are proposing to construct in a northwesterly direction we may assume that that would have had an ending then down here somewheres near Norcross, or where would it have ended?

A. It would have ended where the original river joined Twelve Mile creek, or some point above that.

1389 Q. Then in other words, when you said "constructed in a northwesterly direction" you didn't vary more than a mile from the construction of the present ditch?

A. Holding the flood off the neighboring lands by banking it in, that is, preserving all of the gradient possible from Norcross to the junction of the Mustinka with Twelve Mile creek, building embankments, I would say, two hundred feet apart of sufficient heighth to *to* control the flood within those embankments, and then have ditched the rest of the area and discharged that lower down in order to drain their lands.

Q. You think the state of Minnesota was extremely negligent in the method of constructing this ditch from the standpoint of handling flood waters?

A. It was a mistake.

Q. You stated, if I understood you correctly, that that ditch should have been constructed in a northwesterly direction?

A. Well to get the best results I think it should have followed the basin from Norcross in a westerly direction to this point.

Q. Well, where is it to come between the interception of the present constructed ditch and the point you have last mentioned—on a diagonal?

A. Well, the ditch should have followed not in a straight line, but with curves, the line of greatest advantage, intersecting the meanders of the river from the point where the ditch now begins below Norcross to where the channel joins Twelve Mile creek.

Q. Then you didn't intend to say in the original exa-ination that the ditch should have been constructed in a general northwesterly direction?

A. I don't remember that I said that.

Q. Professor Sardison, what is the fall of the Rabbit river?

A. I don't know. I can't tell you off hand.

Q. What is its length?

A. I can't tell you without referring to the maps. Its head is given on practically all the maps as in Upper Lightning Lake. That, however, is only one branch of that river.

Q. Suppose we take the part we have been referring to here, that is the part that comes down into the Tintah slough?

1390 A. It rises east of the Herman beach in the region that has been called the moraine zone and flows westward across the Herman Beach.

Q. I don't care anything about these long lectures, Professor. Can't you give us an answer to the question. I asked you what the fall was and what the length was. If you know what it is say so, and if you don't know say so?

A. In feet and miles I can't do it.

Q. How long do you figure it would take the water to run from the source of the Rabbit river into the Bois des Sioux?

A. I don't know.

Q. How long do you figure it would take the water to reach from the upper part of this Mustinka watershead into Lake Traverse?

A. I haven't calculated that.

Q. Have you any idea?

A. Not sufficiently exact in hours so as to state it.

Q. Do you think your judgment would be of any particular value if we get away from hours and say weeks?

A. Now the water in the Mustinka flows rapidly and the flow from the head of the river to Lake Traverse should take place in two or three days.

Q. Are you speaking now in a state of nature or with the ditch construction?

A. Either way.

Q. You don't think the ditch construction has accelerated the flow of the waters at all?

A. No. When you come to speak of days it would make no difference.

Q. And how long do you say it would take the flow of the Rabbit river?

A. About the same length of time.

Q. If the distance in the Mustinka valley was twice that of the Rabbit river and the facts disclose that the Rabbit river had a velocity of fall of twice as much, would you still adhere to your opinion?

A. Only as an estimate. I took that into consideration when I answered your question.

Q. In other words, you assumed that a river having half the length of another and twice the fall, that the flow would be substantially the same?

1391 A. No, I took into consideration the facts as to what and where the head of the Mustinka river is and the fact that it flows through one or two lakes in its course over against the fact that the Rabbit river rises at a higher elevation and a large part of the river reaches the Bois des Sioux without going through any lakes, but part of it lies over a steep course in which the channel meanders very greatly and part of it lies over a smoother course in which the channel does not meander so much and other factors. So far as I have seen the two streams I assume that there is not any very great difference in the length of time that the water would flow from the head of either to the Bois des Sioux.

Q. Now assuming that to be so the waters of the Rabbit river would have time to flow down the Bois des Sioux in the Red river of the north before the overflow of Lake Traverse could reach the mouth of the Rabbit river?

A. In the same storm, yes.

Q. In the same flood period?

A. Not if the flood period extended over two days, that might not be the result.

Q. Is that your opinion?

A. I said it might not.

Q. Is that your opinion?

A. Certainly, I am speaking seriously.

Q. You think that the waters from the Rabbit river would be retained in the river and at the mouth of the Bois des Sioux for a sufficient length of time to be overtaken by the flood waters from the Mustinka valley down into Lake Traverse and through the Bois des Sioux if the flood was over two days' duration?

A. A few days I thought I said.

Q. No, you said two days?

A. Well that involves so many different conditions as to the state of Lake Traverse and the already flooded state of the Bois des Sioux, which might be very great or very little, and would make it difficult to say whether any of the effect of the Mustinka river would reach from the mouth of the Mustinka to the mouth of the Rabbit in a period of two days or not, but in case of a very large flood going down the Mustinka river into an already flooded and overflowed condition of Lake Traverse and the Bois des
1392 Sioux I think two days would be sufficient time for that flood to catch up to the flood at the mouth of the Rabbit river, and then if that flood was coming down at that time in the Rabbit river at least part of it would meet. There would be some meeting there.

Q. Did you observe on the Dakota side a north and south road?

A. Yes sir.

Q. Running substantially parallel with the course of the Bois des Sioux?

A. Yes sir.

Q. Did that road have any damming effect?

A. I think it did, yes.

Q. In other words, you think it restricted the ordinary run-off from the west into the Bois des Sioux?

A. Yes, sir, I think it was highest in places where the land was low and where the run-off should be the greatest.

Q. Do you know anything about the maximum discharge at the mouth of the Mustinka channel?

A. No sir.

Q. Could you make any estimate of it?

A. I presume I could if I took the trouble to do it.

Q. You wouldn't want to undertake it now without a conference with some of the engineers?

A. That lies out of the line of my work. I always trust that to the engineers.

Q. You don't pretend to know anything about the duration of the floods with which we are dealing?

A. No sir.

Q. You don't know whether they were floods that lasted for ten days or two weeks?

A. No, not from my own observation, certainly.

Q. Or the heighth of the waters other than you have stated?

A. Other than I have stated that I saw the flood marks.

Q. And I understand you never were in this region with which we are dealing at the time of what we call a flood period?

A. No, I have never been there during that time.

1393 Redirect examination.

By Mr. Palmer:

Q. Professor Sardison, you spoke about the lands represented by this light blue colored area on Complainant's Exhibit No. 1, and which have been here called a delta zone, as having been examined by you to ascertain whether they were subject to overflow. I want to ask you what would indicate that fact that these lands were subject to overflow or submerged from time to time as has been alleged here?

A. There would be perceptible modifications of the surface which should be detectable to the eye, and there also would be flood deposits. There are inevitably lower places that would catch the wash off from little higher places and from neighboring lands and would show that it was a flooded area. If it was a delta as implied in the name "delta zone" it must necessarily be that which all deltas are, and that is a building up of sediments. I looked the area over and except in the Redpath sloughs there was no building up of materials.

Q. Was there any silting or any evidence of overflow of the lands?

A. I saw no evidence of any kind that would justify me in assuming that these lands at any time had been flooded in the way which is implied by the term overflow. They have only been subject to rains and the run-off from rains without any dam or bar holding the water back on to the lands. Another thing, that where lands are flooded lands, if that implies a continual flooding such as to saturate the ground, as I testified before, the action of frost is radically different in such lands than it is in lands that are dry and arable, and I found the normal subsoil conditions of dry land over the whole area except in about three and a half sections or square miles at the Redpath sloughs and at certain wet spots along the Mustinka river, and perhaps a very small area in the Tintah slough.

Q. Well, now these streams that are there, Five and Twelve Mile creeks and the old Mustinka were placed there by nature for what purpose?

A. To carry off water.

Q. And not to bring it on?

A. No sir, they are not provided with distributaries. They are

provided only with tributaries, and tributaries are for the purpose of carrying water into the stream that is carrying the water
1394 off the land. If the stream flows onto land there should be perceptible distributaries as there is in a typical delta.

Q. Now contrasting this area with the area of these alleged flooded lands in the Bois des Sioux valley, what did you find?

A. The alleged flooded lands in the Bois des Sioux valley have flood channels crossing that area, and it does have the marks, if not over the entire area at least over a large part of it, showing that a deposition from standing water takes place. There is a silt there, and the general configuration of the ground is such as is consistent with the assumption that the area that is colored yellow on Complainant's Exhibit No. 1 is and has been a flood plain.

Q. Subject to overflow?

A. Yes sir.

Q. Now as far as the fertility of the lands are concerned what effect has this overflow?

A. Well, I should say if there are floods at intervals of long time, like fifty years or twenty-five years in the aggregate it would be a benefit to the country by fertilizing it rather than damaging it.

Q. Now did you in addition to examining the plowed up places and places where animals you say had thrown up the earth, dig into the ground at many points of this Bois des Sioux valley area to determine as to the presence of that silting?

A. Yes sir. I had the geologist's trowel which I usually carry and dug in at -very opportunity.

Q. Now I understand you to say on cross-examination that these roads that passed transversely across the valley of the Bois des Sioux and also the road that goes north and south near the main channel of the Bois des Sioux served to aggravate the flood conditions there upon the land rather than protect the land from flood, as was intimated in the question of counsel. Why is that?

A. It is on the principal that a dam in a valley does not protect the flood plain below from extreme or high stage of flood. The dam holding water back of it in the valley occupies a part of the reservoir capacity of the valley so that when the peak of the flood arrives the valley being partly occupied it is necessarily precipitated on.
1395 Now these roads across this flood plain hold back the first overflow which reaches them to such an extent that there is an already occupied area above them when the peak of the flood from above comes down. As a consequence there is less capacity for taking care of the maximum stage of flood than there would have been if there was not that retarding of the earlier flow in front of it. And because of the already filled-up condition back of these dams the peak of the flood necessarily goes on over and those lands below are not protected during the time of the peak of the flood.

Q. Well, the water once having gone over these roads——

A. It has, of course, the same volume with which it arrived from above.

Q. —would flood between the roads, as I understand it at succes-ive stages?

A. Yes sir.

Q. And this north and south road—what effect would that have?

A. The north and south road has the effect of holding the waters from crossing over from the west or southwest direction into the Bois des Sioux, and it also serves to converge the flood northward on the west side of it against the east and west roads making a sort of corner. of the flooding at the intersection of the north and south roads with the east and west roads.

Q. Now did you see anything of those corners that would indicate that that is where the serious flooding occurred?

A. It was in the neighborhood of the intersection of the north and south road, which runs from the northwest corner of White Rock, with the east and west road that crossed at Blackmere that I saw deserted farm buildings and was engaged in an estimate as to why that part of the plain rather than any other had apparently suffered with the greatest severity, and I attributed it to these roads.

Q. Now I want to ask you, Professor Sardison, about the area tributary to the Bois des Sioux valley and Lake Traverse in South Dakota, as indicated on this map, Defendant's Exhibit 6, and also on the quadrangles of that area, Defendant's Exhibits 22, 23 and 74. Did you travel over that area?

A. Yes, I made one trip over the area, and in fact I went along the flood plain also on a second trip. I went only once outside of the valley of the old river Warren.

1396 Q. Now from your examination of that area, and also from the indications of its character from these quadrangles, I wish you would described it?

A. The part of the region which I saw was practically that in South Dakota, and that is in part a high till plain just immediately west of the canyon of Lake Traverse. And then there is the moraine which runs over close below the mouth of the Cottonwood canyon northward, and then there is another morainic strip which runs on the west side of the Cottonwood canyon, and right west and northward, and between the two moraines there is a till plain again on the west side of the Cottonwood slough itself. This area is a gently rolling and in part a strongly rolling surface with in-umerable kettles and depressions, a large number of which have no outlet, at least in normal seasons, and some of those which I saw never do overflow naturally. The whole area is, however, intersected with drainage lines a number of which lead directly down into Lake Traverse by deep ravines, steep drainage lines along which the water would flow in the flood and soon discharge into Lake Traverse. A large part of the area drains into this Cottonwood slough, part of it in the upper end of it and thence through eastwardly forming a delta between Mud Lake and Club House Lake. A part of it drains south through what is known as Jim creek into Lake Traverse. The whole area is one which, so far as it is provided with drainage lines, would have a comparatively rapid run-off.

Q. Now is it an area that is substantially benefited by artificial drainage?

A. Yes, there are in-umerable basins of from possibly a square

mile down to an acre or a quarter of an acre which will, and I believe in part have been benefited by drainage, by ditching, so as to give them an outlet, if they didn't have one before, or a more ready outlet.

Q. And where these artificial conditions obtained what would be the effect as to the acceleration of the run-off?

A. Well, in case the ground is already saturated, the run-off would be very greatly accelerated by ditches, but the elimination of such large areas of meadow and wet ground, which at present I take for granted offers very little water reservoir in itself, would give a reservoir in the subsoil of some four or five feet, and might and probably would reduce the amount of run-off of the area in normal seasons.

1397 Q. And would that be true also as applied to the Minnesota side?

A. That is true in a certain area of the Minnesota side where there are sloughs and ponds such that the ground under them is perenially or essentially perenially saturated.

Q. Now contrasting this morainic formation of this area in South Dakota with the morainic formation on the eastern side of this drainage area in Minnesota, what would you say?

A. Well, there is a larger proportion of true moraine on the west side than the east side, and a smaller proportion of till plain.

Q. By the west side you mean the Dakota side?

A. Yes sir.

Q. And by the east side you mean the Minnesota side?

A. Yes, sir.

Recross-examination.

By Mr. Boutelle:

Q. Do I understand you that all ditches except those constructed in the Mustinka drainage district accelerate the flow of water?

A. I think ditches which are constructed for the purpose of accelerating the flow of water and are intelligently constructed in that way do accelerate the flow of water anywhere.

Q. How long were you in South Dakota?

A. One day.

Q. When?

A. September 6th.

Q. What year?

A. This year.

Q. How many ditches did you examine there?

A. I didn't examine any ditches at all.

Q. How many miles of ditching did you see?

A. Not many, probably didn't with my own eyes see anything worth talking about

Q. That is what I thought. You don't know how long what you did see, that was not worth talking about, had been there?

1398 A. Well, what I did see were old. They were not new.

Q. This Cottonwood slough that you have referred to is an institution of some age, I take it?

A. Yes sir.

Q. Some thousands of years?

A. Well, I think it has been there as long as Lake Traverse has been where it is.

Q. So there is nothing artificial about Cottonwood slough?

A. Except, I think, the opening from one slough to the other, down through the valley

Q. You don't know when that was put there?

A. No.

Q. For all you know it may have been there for fifty years?

A. Well, it didn't look that way.

Redirect examination.

By Mr. Palmer:

Q. Well, this Cottonwood canyon as you speak of it, is the same one you have mentioned as one of the outlets of Lake Agassiz the same as Lake Traverse?

A. Yes sir.

1399 October 4, 1917, 10 a. m.

Hearing resumed pursuant to adjournment, with all parties present.

OSCAR B. NELSON, having been called as a witness on behalf of the defendant, was duly sworn and testified as follows:

Direct examination.

By Mr. Palmer:

Q. Where do you live?

A. I live in Minneapolis.

Q. How long have you lived there?

A. Off and on since 1900.

Q. How old are you?

A. Forty-three.

Q. What is your profession?

A. Civil Engineer.

Q. Are you a graduate of any school of engineering?

A. I am a graduate of the University of Minnesota, Civil Engineering Department.

Q. What was the date of your graduation?

A. 1905.

Q. And what has been your business since your graduation?

A. I have been occupied as civil engineer since that time.

Q. And along what lines have you practiced your profession since you- graduation?

A. I have been employed by the Northern Pacific for about five years in the early part of the time after I graduated and before that; that is, during school time I also put in two summers in structural work, structural engineering.

Q. And what lines has your practice followed since your employment by the Northern Pacific?

A. Well, I have done some drainage work and I have been instructor at the University of Minnesota for some time in railroad surveying, and typographical surveying, and other subjects; I have also conducted improvements at the University Campus such as heating tunnels and other improvements.

Q. But in general have you practiced your profession continuously since your graduation, Mr. Nelson.

1400 A. Yes sir. I was *in* employed one season in North Dakota on drainage work for a large land company there, and I have also done some other drainage work. The last four years I have done mostly private work in the line of water works, drainage and sewage disposal.

Q. I don't expect you to qualify as an expert in this case, Mr. Nelson, but I will ask you if you have been engaged in doing surveying work and Civil engineering in connection with this case?

A. Yes sir.

Q. Under whose supervision and direction?

A. Professor Bass.

Q. But were you employed directly by the State of Minnesota?

A. Yes sir, that is the way I understood it.

Q. Are you the Mr. Nelson referred to by Prof. Bass in his testimony as having done the actual field work in connection with the various plats, maps and diagrams and cross-sections that have been introduced in evidence here?

A. Yes.

Q. And in this field work did you have some assistants?

A. I had the assistance of a son of the local county surveyor of Traverse County, Mr. Dodds.

Q. Harvey Dodds?

A. Yes sir.

Q. Is he also a civil engineer?

A. No, he is a surveyor.

Q. Is he a surveyor of some experience?

A. Some practical experience. I understand he is not a graduate and has no other experience except surveying, but considerable surveying experience.

Q. How old a man is he?

A. I think he is 32 or 33.

Q. And did you have some other assistance besides Mr. Dodds?

A. I did at times. I used two or three different parties.

Q. But you were in charge of the actual field work?

A. Yes, sir, I ran the levels, that is done the actual work myself, as far as possible.

1401 Q. How many days approximately did you spend upon the ground?

A. Approximately sixty days in the field work.

Q. And in office work upon this particular area?
A. Also approximately sixty days.
Q. Both together, 120 days?
A. Yes sir.
Q. When was this work done, the field work and office work?
A. From May 24th up to the present time.
Q. May 24, 1917?
A. Yes sir.
Q. Now will you state generally what your field work consisted of?
A. The field work consisted of running base level lines, running lines between government bench marks to establish independent bench marks. For instance, I ran a line of levels from the government bench mark at Wheaton approximately twenty-four miles to the government bench mark in the Southwest corner of Section 16-128-44.
Q. What would be what point?
A. That would be just west of the Great Northern Railway and northwest of Norcross about a mile and a half.
Q. Would that be the point marked by the Great Northern Railroad bridge at Norcross that has been referred to here?
A. Very close to it.
Q. And where else did you run levels?
A. Then I ran a special line for establishing bench marks from the government bench mark at White Rock to the government bench mark at Breckenridge, and established bench marks on the bridges during that run.
Q. And did you run other levels?
A. And from these I ran out other lines of levels.
Q. These government bench marks to which you refer were made by a branch of the government engineers?
A. The United States Geological Survey.
Q. Then you took as the basis of your work the sea level datum as established and marked by the United States Geological Survey.
1402 A. Yes sir.
Q. Where was this government bench mark at Wheaton from which you ran your levels?
A. It is on the step outside of the store of—I don't remember the name. I could look it up. It is on the step of a store on the main thoro'fare at Wheaton.
Q. Stone step?
A. Yes sir, and it is a brass plat set in this step.
Q. Then it is a permanent bench mark?
A. Yes sir.
Q. Now have you heard the testimony here by the engineer employed by the complainant here, Engineer Ralph?
A. Yes sir, part of it.
Q. And you have examined the map that has been submitted here Complainant's Exhibit 1?
A. Yes sir.
Q. What bench marks are used by the Complainant's Engineers

so far as you are able to tell from your work there on the field by the complainant?

A. As far as I have been able to tell we have been using the same datum, the datum established and corrected from time to time up to date by the United States Geological Survey.

Q. In other words, do you mean that they seem to have used the same corrected datum that you used?

A. In all respects, as far as I could tell.

Q. Did you make this map, Defendant's Exhibit No. 6, Mr. Nelson?

A. Yes sir.

Q. From what date did you make this map?

A. If you will allow me I will give you a kind of general idea of what data we have supplied by actual field work. It was found advisable to use all the information obtainable from this Geological Survey datum, and the object in view has been to supply what has been lacking in this datum. This Geological Survey datum was not sufficient to supply the more detailed and finer sub-division, or rather, in the case of the contour lines, to get smaller intervals.

Where the Geological Survey data could be used it has been
1403 so used and our own information supplements it. Also in this region where the contours are shown on this Defendant's Exhibit No. 6 I have used some data obtained in these ditch surveys, but hav- checked both ends of these surveys so as to be able to verify their accuracy, and we assumed that in between the two ends the survey was correct. I have run altogether in this work some 230 miles of levels, and covered between three and four thousand miles in the automobile.

Q. Then in so far as the field was covered by the United States geological quadrangles you used the data from those?

A. Yes sir.

Q. But where those——?

A. Where those failed to give sufficient detail I have supplemented them.

Q. By actual work on the field?

A. Yes sir.

Q. Now the United States Geological Survey give the contour lines at what distance?

A. At ten foot intervals through this district. Of course they vary, but through this district I think the general interval is ten feet. This map, Defendant's Exhibit No. 6 has the five foot intervals.

Q. That is in the localities which you deemed particu-arly important and material in the case you established contours at five foot intervals?

A. Yes sir.

Q. And those are shown on the brown lines on this Exhibit No. 6?

A. Yes sir.

Q. Now the limits of the drainage area as shown on this Defendant's Exhibit No. 6 and also on Exhibit No. 7, how are those fixed?

A. I traced them partly in automobile, and where there seemed to be any material difference between our information in the matter

and Complainant's Exhibit 1 we established the dividing line of the drainage areas by running levels from government bench marks to government bench marks. Such lines of levels were run in the southern portion such as in the townships of Baker, Moonshine and Graceville; also several of these lines were run in South Dakota.

Q. What townships?

A. In Grant Township, and I think Enterprise township, and also north near the state line.

1404 Q. Of North Dakota?

A. Between North and South Dakota.

Q. That is, Mr. Nelson, where it appeared doubtful that the limits of the drainage area as shown on Complainant's Exhibit No. 1, which was Exhibit A accompanying the bill of complaint, you went over the ground and ascertained with accuracy where the drainage limits were?

A. Yes sir, except that the portion marked surrounding the Upper Lightning Lake we didn't go up to that po-tion, that is I didn't.

Q. You used the government quadrangle for that?

A. Yes sir. At all other points we used the government quadrangles to establish or check the dividing lines.

Q. I call you- particular attention to Defendant's Exhibit No. 28. Was that exhibit made by you?

A. Yes sir.

Q. What does it show?

A. It shows the outlet area of Lake Traverse to the north.

Q. Through what has it been termed here?

A. Along the Bois des Sioux valley.

Q. Does it show the entire Bois des Sioux valley from its beginning at the Northerly end of Lake Traverse to the Great Northern Railway north of Fairmount?

A. Yes sir, that is up to contour approximately 980. Very little is shown above this contour line.

Q. That is to contour line 980 feet, sea level datum, on both sides of the valley?

A. Yes sir.

Q. Between those contour lines 980 on both sides of this valley substantially the entire valley of the Bois des Sioux?

A. Yes sir, as far as the flow of the water is concerned.

Q. And as far as the overflow area has been described and mentioned here, Mr. Nelson? Is that correct?

A. Yes sir.

1405 Q. Is that substantially the area shown in the yellow shading on the map, Complainant's Exhibit 1? I mean so far as North Dakota is concerned?

A. It includes all that area as far as it goes.

Q. To the north?

A. Yes sir.

Q. The area shaded in yellow on Complainant's Exhibit 1 extends somewhat northerly of the Great Northern Railroad and on up to the mouth of the Rabbit river?

A. Yes sir, and also southerly of that shown on this map.

Q. And also southerly around the edges of Lake Traverse?

A. Yes sir.

Q. But now so far as you- map Exhibit 28 covers the area shown in yellow on Complainant's Exhibit 1, does it show more or the identical area shown by the other?

A. It shows more.

Q. Between what contour lines is this yellow shaded area on Complainant's Exhibit 1?

A. No special contour lines.

Q. About what one?

A. It is from 976 to 968, I think.

Q. And yours runs from 980 to 980 on each side?

A. Yes.

Q. What is the distance in elevation between the contour lines on Exhibit 28?

A. One foot.

Q. Those are what you might call one foot contour lines?

A. Yes sir.

Q. And from what were those established, Mr. Nelson?

A. They were established, as described before, from levels run by myself, run on cross lines, that is on north and south lines and east and west lines through this area, and supplemented by data taken from the United States Geological quadrangles.

Q. You mean supplemented or verified?

A. Supplemented. That is because the United States Geological quadrangles did not show the intervals small enough to get a practical idea of this area these levels were run and the data supplied.

1406 Q. The United States Geological Survey quadrangles show what intervals?

A. Ten feet intervals. It was entirely necessary in order to show the nature of these channels and so-called high lands in this district and in order to show the topographical features in sufficient detail, to run these levels.

Q. Beginning now at the extreme right, or southerly end of the area shown by this Exhibit 28, what is the depression that you have marked here "Big slough"?

A. It is a branch or part of what is otherwise called Cottonwood slough.

Q. Which part of the Cottonwood slough or canyon?

A. The northerly part. It connects with the northerly part of Cottonwood slough.

Q. That is the northerly outlet of what has been called here Cottonwood slough or canyon?

A. Yes sir.

Q. And this shows its entrance into the lake on the westerly side?

A. Yes sir.

Q. And this area right north of it marked Club House Lake is that the lake just north of the delta that was described by Professor Sardison as having been built by the influx from the northerly outlet of Cottonwood canyon?

A. Yes sir.

Q. And to the east of the entrance of this Big slough, as you have described it, what is the next water area shown?

A. That is the channel of the Bois des Sioux river.

Q. Does that show the very beginning of the channel of the Bois des Sioux river?

A. I think so. I think that is what is called the beginning, the outlet of Lake Traverse.

Q. Into the Bois des Sioux?

A. Yes sir.

Q. And how far is that south from White Rock?

A. Approximately three miles.

Q. What is the area shown between Club House Lake and this Bois des Sioux channel?

A. It is as shown on the United States Geological Survey maps and as viewed from the heighths on each bank a hay marsh.

1407 Q. What is its heighth—between what contours is it?

A. I didn't run any levels there, but from observation I should judge the elevation was from 974 to 976, somewheres along in there.

Q. And that rising land between Club House Lake and the Bois des Sioux channels extends about how far north?

A. Approximately to a mile south of the north line of White Rock, the south line of Section 9.

Q. And it would be about how many miles long?

A. Well, it extends farther than this map shows to the south.

Q. Do you know from observation about how far it extends to the south?

A. No, I don't remember at the present time.

Q. I suppose that would vary with the amount of water in the lake?

A. Yes sir.

Q. Did you go over and examine this area of land in between Club House lake and the Bois des Sioux channel?

A. No sir, not exactly where the contours are shown, in Sections 15, 16, 9 and 10.

Q. You didn't go south of there?

A. No sir. Not except as viewed from the hills on the east side of the valley.

Q. You say you would call it a hay marsh?

A. Yes sir.

Q. Hay put up there this year?

A. I didn't see any.

Q. Were you there after haying season?

A. I observed it from the hills on the east side of the valley and I saw no hay stacks. That is south of the line of Section 16.

Q. That would be in White Rock township, South Dakota, that I am asking you about now?

A. Yes sir.

Q. Now the land shown in these contour lines immediately south

White Rock in Sections 16, 15, 9 and the southwestern portion of —did you go over that land?

. Yes sir.

Q. What is the character of that land?

8 A. In the Southwest corner of Section 10 there is considerable cultivated land; also in the west half of Section 15 or t portion west of the Bois des Sioux river has considerable cultied land, but the land in sections 9 and 16, which is comparatively h, is a hay meadow.

Q. Hay put up there this year?

. Some hay was put up on Section 9.

Q. What is the character of the soil as to——?

. On the high ground the soil, I should judge from the appearе was fairly good. In the low areas it is considerably covered h large boulders. I found a number of boulders taken out of field evidently and placed along the Section line, and also a nber of large boulders in all the low places.

Q. Now between what contour lines does the high land lye there Nelson?

. I should say that the cultivated land would be abouve contour 975.

Q. Did you examine that land to see whether it had been subject verflow?

. The cultivated portion did not appear to have been subject to rflow.

Q. Do you mean not even in 1915 and 1916?

. I don't think so. I don't think it had been overflowed.

Q. What is the condition of the cultivated land there this year?

. It was cultivated, and the portions described before was in ds at the present time.

Q. Crops growing on them?

. Yes sir.

Q. What was the nature of the crops?

. There was some barley, I think and some flax and some wheat.

Q. Good or poor?

. Well, I am not an expert on crops but I should say fair.

Q. About the same as other crops that you saw in that region?

. Yes sir.

Q. Now continuing north, I want to ask you about the land imediately west of the village of White Rock, south of the road, I ll say. Is this White Rock road indicated by the triple line?

A. Yes sir.

09 Q. To the south of the road?

A. Well, immediately west there is a portion of the fairly gh land, but there seems to be a saddle or draw—well, it is really lled a saddle, bearly opposite the center of town.

Q. On the west side?

A. Yes sir, so the water would in high stages overflow. That is, nen you pass the center line of Section 9 north and south no area s cultivated there as far as I saw. It consists mostly of marsh d hay land, and open water surface.

Q. What indicates on this map the open water surface west of White Rock?

A. The continuous black line.

Q. Now was that water surface at the time that you surveyed it?

A. Yes sir.

Q. Were there indications that this water surface had been at times considerably larger?

A. I think so. The appearance of the land would show or tended to show that it had been covered.

Q. Then, as I understand you, between the quarter line of Section 9 over to and through this village of White Rock the land is comparatively high, except that there is a natural draw or channel through which the waters overflow?

A. No, there is just a small depression through the ridge, where in high stages the water would flow across.

Q. Where would it go then?

A. Into a draw or slough in the west portion of the town of White Rock.

Q. And from there?

A. From there it would go to the Bois des Sioux river.

Q. On the easterly side of the village?

A. Yes sir.

Q. Between what contours does this draw or depression run through the village?

A. Contour 973 shows the lowest contour; although there are lower elevations, they don't go as low as 972.

Q. Then if the waters raises to the heighth of 975.5 and above it would be bound to cross this depression in the ridge west of
1410 White Rock, flow easterly and northerly through the village and join the Bois des Sioux channel on the easterly side of the village?

A. Yes sir.

Q. And that accounts for the flooding in the village as has been testified to here, in 1915 and 1916?

A. I would say, considerably.

Q. And that would take in what part of the village?

A. The slough or draw is in the direction of the main business portion of town.

Q. And would take in what area of it, a third or a half or what?

A. As far as I could see the high water in the village of White Rock itself took in all the territory up to contour 974, about one-third of the village.

Q. Approximately one-third of the settled portion?

A. Yes sir.

Q. Now on westerly of this ridge west of White Rock you say there is a considerable area of open water?

A. Yes, sir.

Q. And it would appear from these contours that some of the land *rasies* to 975 and 976 in between these water areas?

A. Yes.

Q. Is that land apparently subject to overflow?

A. In the highest part it is not.
Q. Well, which part?
A. The land below contour 975 or 975.5.
Q. You mean above 975.5?
A. No below.
Q. The land below 975.5 is subject to overflow?
A. I should think so, as far as my judgment goes, possibly higher.
Q. This Exhibit 29, Mr. Nelson, the profile of the White Rock road in detail was made by you?
A. Yes sir.
Q. From what?
A. From elevations run along this road. As noted on the exhibit, no horizontal distances were taken. The horizontal distances are only approximate.

1411 Q. The elevations are correct?
A. Yes sir.

Q. And were from actual levels?
A. Yes sir, actual levels run from geological survey bench marks.
Q. I will not go into details on this Defendant's Exhibit 29. The various openings in the road and their area and elevations have been correctly given here by Prof. Bass from this actual work done by you upon the field?
A. I have not checked his calculations, but I have no reason to doubt their accuracy.

Mr. Palmer: I offer in evidence Defendant's Exhibit 29.

Q. Mr. Nelson, going now easterly from the village of White Rock I wish you would describe in some detail this Milwaukee Railway grade and bridge there, and also describe the bridge on the White Rock road across the Bois des Sioux channel?
A. The Railroad bridge of the Milwaukee railroad across the Bois des Sioux just east of White Rock is a 78 foot trestle bridge.
Q. How deep is the water surface there?
A. That varies. I made no cross-section of this section at the bridge, but June 8, 1917, the distance from the top of the bridge to the water level was approximately five feet, that is from the top of the rail, and the depth of the water 3.3 feet, or an average of about 3 feet, that is, flowing under the bridge.
Q. That is, as I understand it, the main channel of the Bois des Siouv river proper which marks the boundary line between South Dakota and Minnesota?
A. Yes sir.
Q. How high is the railroad grade at that point?
A. The elevation is approximately 976, the elevation of the top of the rail.

Mr. Bronson: Where the track goes across the bridge?

A. Yes sir.
Q. Now the wagon bridge in the White Rock road? The one across the Bois des Sioux channel in the easterly part of the Village of White Rock?

A. Twenty-eight foot span.
Q. The elevation of the bridge?
A. The elevation of the bridge floor is, the bench mark on the south guard rail is 975.89.
1412 Q. Now how far is this guard rail above the floor of the bridge?
A. Approximately five inches.
Q. What if the distance from the bridge flood to the water surface?
A. About five feet, at this time, that is from the the guard rail; from the bridge floor the distance would be approximately four and a half feet on June 8, 1917.
Q. Was that a time of low water?
A. I should say it was approximately mean water level.
Q. What is the elevation on either side approaching the bridge?
A. In the low spots near the bridge, between 60 or 70 feet west of the center line of the bridge it is approximately 973.5.
Q. How wide a space is that?
A. Well, it continues westerly at approximately this elevation for the greater part of the distance to the railroad tracks.
Q. Did you see evidences of the overflow and the washing away of the grade there?
A. No, except as the evidence of repairs gave evidence of washing away.
Q. And regrading?
A. Yes, and regrading of the road.
Q. How much of this 973.5 is above the level of the surrounding land?
A. Well, the land slopes gradually toward the channel, that is, considering the general slope to the land.
Q. Well it seems to be shown of the contour?
A. Yes sir.
Q. From 972 down to 970 and still lower down to the channel?
A. Yes sir.
Q. Did you take any level of the grade and roadway easterly of the bridge?
A. Yes sir.
Q. What is that?
A. Well, it is shown on this profile of the road, Exhibit 29.
Q. About what is that?
A. The grade is approximately 973.7 for about 600 feet.
Q. The details of this entire grade then are shown on this Exhibit 29, the profile?
1413 A. The profile shows the top of the grade, that is approximately the center of the grade.
Q. Now your notation on this Exhibit 29—"Horizontal distance are approximately only"—does that apply also to this Exhibit 28?
A. It applies to all the maps and profiles prepared by me in this case.
Q. Now continuing north over this White Rock road, I wish you would commence over on the west side of this Bois des Sioux valley

and give a general description of the land, beginning in Section 5, White Rock Township, and proceeding easterly through 4 and 3?

A. Section five has two channels, overflow channels, running north. That is, the direction of the flow is northerly.

Q. From the road?

A. From this White Rock road.

Q. How wide are those channels?

A. Well, one is quite narrow and the other is wider.

Q. Which one is the wider?

A. The westerly channel is the wider. It is a mile approximately, or in effect.

Q. Subject to overflow?

A. Yes sir.

Q. Periodically, I suppose?

A. Periodic overflow, yes sir.

Q. About how wide is that marsh?

A. Well, it varies from a few hundred feet, from say four or five hundred feet up to probably two or three thousand feet as shown on the map.

Q. What is the nature of the land in there?

A. Well, I didn't examine that land in detail, but it consists of marsh and higher knolls.

Q. Agricultural land?

A. Some hay land.

A. Any cultivated land?

A. I didn't notice any except in the northwest portion of Section 5.

Q. I am asking you particularly about the part you have
1414 marked "marsh" in the westerly portion of Section 5?

A. That was not under cultivation as I saw it.

Q. Had it been apparently under cultivation?

A. I didn't observe so as to tell that. I don't think so.

Q. Now proceeding easterly, there appears to be, from these contour lines, a sort of ridge of high lands?

A. What might be termed an island between those t-o channels.

Q. Rising to the heighth of 976?

A. Approximately.

Q. What is the nature of that?

A. It is hay land, as I remember it.

Q. Any cultivated land on it?

A. I didn't notice any.

Q. Is that land subject to overflow?

A. I shouldn't think so. That is, not the higher parts.

Q. How about 1915 and 1916?

A. I understood they cut hay on there this year and have been cutting hay there.

Q. Did you observe whether it had been overflowed in 1915 and 1916?

A. No, I didn't.

Q. Now proceeding easterly—where is this next draw that you spoke of, or channel in Section 5?

A. There is a channel in the east portion of Section 5, a narrow draw, and then the land rises toward the section line.

Q. Is this an overflow channel carrying water to the north?

A. Yes sir.

Q. How wide is it?

A. Well, as it is shown on the map it probably would be fifty or sixty feet wide. It depends of course on the elevation of the water.

Q. Have the lands through that channel any agricultural use?

A. Land in the channel?

1415 Q. Yes.

A. No, I don't think so.

Q. Apparently at no time?

A. No.

Q. Now in Section 4?

A. Section 4 is in the northwest portion of high land.

Q. Did that bear evidence of having been overflowed in 1915 and 1916?

A. Not the higher portion.

Q. What is the condition of that land with respect to rock?

A. I didn't see any rock on the higher portion of land.

Q. How about the lower portions?

A. I saw an occasional rock.

Q. In section 4 are there any more of these channels or draws running to the north?

A. Yes, there is a draw running northeasterly through the section.

Q. Through Section 4?

A. Yes sir.

Q. How wide is that about?

A. It varies considerably. It varies anyway from a 100 feet up.

Q. Its width is shown approximately here on the map?

A. Yes.

Q. Is that channel apparently in use for the overflow of water going north and northeasterly?

A. The water flows through there, yes sir.

Q. Was it flowing through there when you were there?

A. Some water.

Q. And was that likewise true of the channel to the west?

A. Yes sir.

Q. In Section 5?

A. Yes sir.

Q. Now what was the condition of this land you have marked "marsh" here in the northeast portion of Section 4?

1416 A. Well, it is at a lower elevation there and I should judge it would be subject to periodic overflow.

Q. Was it in use?

A. I don't remember. I don't think so on account of the elevation.

Q. What would you say as to it having been at any time in a state of cultivation?

A. I couldn't tell as to that.

Q. How is the land immediately north of White Rock in Section 3?

A. There is some cultivated land in the west portion of Section 3, and also a farmstead.

Q. As indicated by the black dot in the northwestern quarter of Section 3?

A. Yes, sir.

Q. You say there is a farm there?

A. Yes sir.

Q. Set of buildings?

A. Yes, as I remember it.

Q. What place is that—how has it been referred to here?

A. I couldn't tell.

Q. Those farm buildings occupied?

A. Yes, I think so.

Q. Farm under cultivation?

A. Yes.

Q. This year?

A. Yes sir, as I remember it was. We drove through there.

Q. Was this land apparently subject to overflow periodically?

A. Not the higher portion of it.

Q. It overflowed in 1916 would you judge from its appearance?

A. Not the higher portions of it.

Q. Now how is the land immediately along the channel of the Bois des Sioux in Section 3?

A. It had the appearance of marsh land, that is for a considerable distance on either side.

Q. Subject to overflow?

A. Yes sir.

Q. Used for agricultural purposes?

A. I don't think so. I didn't see any that was, unless it would be hay.

1417 Q. How wide is the channel of the Bois des Sioux at that point about?

A. Which point.

Q. Through Section 3 north of White Rock?

A. I have an approximate cross section of the Bois des Sioux channel on Defendant's Exhibit 29.

Q. Now tell me about that, the profile of the channel in Section 3?

A. No, this is 400 feet north of the boundary line between South and North Dakota.

Q. That would be 400 feet north of the north line of Section 3?

A. Yes sir.

Q. Well, tell me the width there?

A. The approximate width, that is between the water lines as it was July 16, 1917, is approximately 700 feet.

Q. Now continuing northerly in North Dakota, beginning on the westerly side of Section 32, Fairmount township, I wish you would describe that land on the western side, Mr. Nelson?

A. The west portion of Section 32 as shown on the map, a portion of it is high land. It has an overflow channel in the southeastern portion of it.

Q. How is the west half of it?

A. It is fairly high and has an overflow channel in the extreme western portion.

Q. As I understand it then, there is an overflow channel on the extreme western side of Section 32?

A. Yes sir.

Q. How wide is that?

A. Well, I couldn't tell from memory. I have to refer to this map.

Q. Well, the map is correct is it?

A. As far as I know, it is. It is understood that this data that I took is supplemented by data taken from the United States Geological Surveys.

Q. All right, tell me something about the approximate width of that flood channel across the western part of Section 32.

A. As shown on the map it varies from 3 to 5 hundred feet.

Q. Is that a functional channel, apparently carr-ing water.

A. I think it is subject to periodic overflows.

1418 Q. Any water in it when you were there in June and July?

A. I think there was some.

Q. Going easterly, what is the natur[illegible] the land?

A. It raises toward the north.

Q. Up to what heighth?

A. It rises to an elevation of 977, up to a point in the northeast corner of the section.

Q. Is that agricultural land there in Section 32?

A. Part of it.

Q. Under cultivation this year?

A. I don't remember whether any portion of that was cultivated this year.

Q. Cut for hay?

A. I think so.

Q. Did that land bear the appearance of having been overflowed in 1916?

A. I don't remember it in detail.

Q. Any farms there?

A. Not in that section, except there is a farmstead, as I remember it, in the southeast corner of the section.

Q. Occupied at that time?

A. It wasn't occupied at the time I was there, but it had been occupied a snort time before that, I was told.

Q. Now Section 33?

A. Now the larger portion of Section 33 is high land. The only land in that section which seems to be unfit for agricultural purposes seems to be the southwest portion of the southeast quarter and a small portion of the northeast quarter.

Q. And what is there in the northeast quarter?

A. It is low land, I should say hay land.

Q. And in the southeast quarter?

A. Part of it is high land and the rest of it is low overflowed land.

Q. What is that running across there?

A. It is part of the channel from section 4 running across northeasterly through Section 4.

1419 Q. Did this higher land in Section 33 have the appearance of having been overflowed in 1916?

A. The southwest quarter of 33 was at the time when I was there in 1917 in a state of cultivation. It has a farmstead, and as far as I saw of that southwest quarter it was under cultivation. The land in the northwest quarter of this section 33 slopes gradually towards the channel running across the northwest corner of the section.

Q. But whether these agricultural lands there were overflowed in 1916 you couldn't say?

A. There is no evidence of overflow, and from the elevation I obtained by leveling I should judge they were not. In the Northwest corner of 33 there is also a farmstead near the north line.

Q. That occupied?

A. It was not occupied at the time I was there but the farmstead seemed in good condition.

Q. Were the lands there being cultivated?

A. Portions of them as I remember.

Q. Did they give the appearance of having been overflowed in 1916?

A. In the eastern portion of this northwest quarter.

Q. Now Section 34, Fairmount township. Tell us about that.

A. Well, Section 34, is traversed by the Bois des Sioux channel in the easterly portion, and a large portion of that section is hay marsh.

Q. Hay cut there this year?

A. I didn't notice. Portions of it I think there was some hay cut.

Q. Did you notice any cultivated lands there?

A. Some agricultural or cultivated land I think along the west line of Section 34.

Q. Did that give evidence of having been overflowed in 1916?

A. Not the higher portions, not the very highest portions, not that very high elevation, comparatively speaking. The draw running northeasterly through Section 4 also runs through the southwest portion of this section 34 and intercepts the channel of the Bois des Sioux. There is a bridge there in this draw, and eighteen foot wooden bridge.

1420 Q. Across the north and south road?

A. Yes, on the west line of the section in the southwest quarter.

Q. Now, as I understand it there is a graded roadway extending from the west line of this village of White Rock straight on north?

A. Yes sir.

Q. Clear through the valley?

A. Well, I followed this road from the Northwest corner of the town of White Rock four miles north to a point just east of Blackmere.

Q. That is a graded roadway is it?

A. Yes sir.

Q. As has been described here by Prof. Sardison?

A. Yes sir.

Q. Now you say the bridge across this draw that comes up through Section 4 on the west line of Section 34 has how much of a span?

A. Eighteen foot wooden bridge.

Q. How much of a space is there under it?

A. The elevation of the top of the floor of that bridge is 974.76. It is an eighteen foot span, and the depth from the top of the floor is approximately six feet to the bottom of the channel.

Q. I notice that there seems to be a farmstead indicated in this southwest quarter of Section 34, and westerly of the railway track. Is that occupied?

A. I think that is occupied, yes. I think it was at the time I was there.

Q. Land under cultivation?

A. Some land under cultivation.

Q. Land there give evidence of overflow in 1916?

A. I didn't notice any, that is not the higher portion, the very highest portions.

Q. Where the buildings were, was that overflowed apparently?

A. No, I don't think so.

Q. What is the elevation there?

A. 974. It is higher around the buildings.

Q. Now the southeast of 33, there seems to be some farm buildings there. Did you notice those?

1421 A. No, I didn't notice any farm buildings there.

Q. I want to ask you about these roads, going north from White Rock, what is the next road across the Bois des Sioux valley, as far as you observed it—the next east and west road?

A. For portions of the distance there is a road on the state line.

Q. Between North and South Dakota?

A. Yes sir, east and west.

Q. Is that graded?

A. Portions of it.

Q. Where *is* crosses these draws that you speak of or channels was it bridged?

A. I didn't see any bridges there.

Q. Then it appears, Mr. Nelson, that there are three distinct channels through this Bois des Sioux valley at the south line of North Dakota, besides the main channel of the Bois des Sioux?

A. Yes sir.

Q. Now we disposed of one of those by your statement that it goes into the Bois des Sioux channel about the center of Section 34. Coming now over to the west side of the valley again, I wish you would speak about the land in Section 29?

A. The west half of Section 29 has an overflow channel running the full length of the section.

Q. About how wide?

A. Probably from fifty to three or four hundred feet.

Q. Water running in it when you were there?

A. Yes sir. The rest of it is sloping from each side towards the channel. The east half of that section or the larger part of it—very

nearly all — it is high land. I wouldn't say all of it, but the larger portion of it.

Q. What is the elevation there?

A. It reaches an elevation of 977 in certain parts.

Q. Did you notice whether that land was in a state of cultivation, that higher land?

A. Yes, there was a farmstead in the southeast quarter.

Q. Occupied?

A. Yes sir, at the time I was there.

1422 Q. Land under cultivation?

A. Yes sir.

Q. Did you find evidences that it had been overflowed in 1916?

A. Not a very large portion.

Q. Now what is this along the section line north and south between 29 and 28, indicated by the closely drawn contour lines there?

A. It is a side hill facing east, then through the western portion of section 28 there is a hay marsh.

Q. Describe Section 28 further?

A. There is considerable high land in the southeast quarter of the section and some in the eastern portion of the southwest quarter. There is a school-house near the south line of Section 28 on the southeast quarter.

Q. What is through the center of section 28?

A. There is a marsh through the west portion of 29 and continuing into the north part of the northeast quarter. That is one of the overflow channels.

Q. That is the one that extends up in there from Section 32?

A. Yes sir.

Q. Where does that join the Bois des Sioux channel?

A. Well, it is shown in the map. It joins the Bois des Sioux channel running in through Section 27, and also through the east half of Section 21.

Q. Now this school house in Section 28, did you observe the condition of that school house?

A. Fair condition.

Q. Did it bear evidences of having been injured by the overflow of the lands around it?

A. Not that I could see. The elevation was too high for overflow.

Q. Is there a road along the section line between Sections 28 and 33, and 29 and 32?

A. There is a road between Sections 28 and 33, yes.

Q. East and west?

A. Yes sir.

Q. What shape is that road in?

A. Fair condition.

1423 Q. Graded?

A. Yes, I think it has all been graded, that is between those two sections.

Q. About what is the heighth of that Milwaukee railroad grade through sections 34, 28 and 21, up in through there?

A. I should judge the grade varies from a foot and a half to four or five or six feet.

Q. Now describe this land in Section 27 as well as you can, Mr. Nelson?

A. The portion of Section 27 which is just west of the Bois des Sioux channel is mostly low land as far as I can remember.

Q. In use?

A. Not at the present time, I don't think.

Q. Bear evidences of having been overflowed in 1916?

A. Yes, large portions of it, that is, practically all except around the buildings.

Q. What about the buildings in the northwest quarter of Section 27?

A. They were not occupied at the time I was there.

Q. And what is the highest elevation attained by the land there in section 27?

A. Not much of it is above 971, except perhaps around the buildings.

Q. In the northwest quarter?

A. Yes sir.

Q. What is the width of the Bois des Sioux channel through Section 27 there on the section line between 22 and 27?

A. Approximately 500 feet.

Q. That is the actual water area?

A. As it was on July 16, 1917.

Q. Now Section 20, commencing over at the west half of that—tell us about that, Mr. Nelson?

A. There is a draw or several draws through there, on smaller channel coming from a creek entering through Section 30 and flowing northward to the northwest quarter of 29, into the southwest quarter of 20.

Q. These brown lines with the dotted line in the middle here in Section 19 are what?

A. That indicates two branches of a creek merging and coming in there from the northwest into Section 30.

1424 Q. How much of a creek is that?

A. As indicated by the bridge on the north line of 29—there is a sixteen foot wooden bridge there.

Q. The water coming along in the creek when you were there?

A. I don't think there was much flooding at that time.

Q. Did the creek appear to be one in operation, water flowing in there in times of high water?

A. I think there was water standing there, but I don't remember of any water flowing at that point.

Q. Was it a clear open channel?

A. It has an open channel, yes sir. There is also another bridge on the south line of this section 20 over east.

Q. That is this same overflow channel that comes up on the west line of 32 and 29?

A. Yes sir. It has a thirty-two foot steel bridge.

Q. What is the nature of that land along the west half of Section 20?

A. A portion of it is fairly high, but the larger portion of it is low.

Q. Marshy?
A. Some of it.
Q. What is the condition of the rock?
A. I didn't notice much rock north of White Rock.
Q. Now the high land in this western portion of 20, is that cultivated land?
A. Portions of it.
Q. Seems to be some farms buildings on the southwest quarter of 20 close to the west line?
A. There is a school house near the west line of 20.
Q. In the southwest quarter?
A. Yes sir.
Q. What condition is that school house in?
A. Fair condition, I think.
Q. Apparently not injured by overflow from water?
A. I didn't see it. That is, I didn't see any damage.
1425 Q. Did you see any evidence of overflow around it?
A. I don't remember any.
Q. The high land in the west half of sections 20, is that agricultural land as you observed?
A. Some high land in the northwest quarter.
Q. There seems to be some buildings in the northwest corner of the northwest quarter?
A. Yes sir, as I remember it they are occupied.
Q. Land under cultivation?
A. Portion of it.
Q. Now the east part of Section 20, tell us what you can about that?
A. There is some high land there. One set of buildings on the northeast quarter and also a set of buildings where I understood the elevator man lived, at Blackmere.
Q. Now this northeast corner of 20 is where this elevator and stopping place called Blackmere is located?
A. The elevator is located in the northwest quarter of 21.
Q. Now this set of farm buildings in the northeast quarter of 20, are those occupied?
A. As I remember it they were.
Q. Land under cultivation this year?
A. Portion of it, yes.
Q. Bear evidences of having been overflowed in 1916?
A. I didn't notice any evidence of it except that the general level of the land to the east line of Section 20 is low and might have been subject to overflow.
Q. What is the nature of the land around the elevator at Blackmere?
A. Well, high land east, and southeast is low and marshy.
Q. Apparently overflowed in 1916?
A. Yes sir.
Q. Now what shape is western half of 21 in?
A. As I stated before the larger portion of that is overflowed.
Q. Is it in use?

A. I didn't see any of it in use.
Q. Did it give evidences of periodic overflow?
A. I think the larger portion of it was overflowed at the time I was there.
1426 Q. What is this coming up from 28 and running through the center of 21?
A. That is an overflow channel in the western portion of 21.

(Adjournment taken until 2 p. m.)

October 8, 1917, 2 p. m.

Hearing resumed pursuant to adjournment. All parties present.

OSCAR B. NELSON, recalled as a witness on behalf of the defendant and testified as follows:

Direct examination.

By Mr. Palmer:

Q. I was asking you, Mr. Nelson, about the West half of Section 21 in township 129, range 47, being land in this Bois des Sioux valley. I wish you would describe the northwest quarter as well as you can?
A. The larger portion of that quarter is marsh, permanent marsh, I would say, and the west portion of it is quite low slopes gradually towards this marsh, and near the northwest corner of this quarter the elevator at the station of Blackmere is located.
Q. That land is all below what contour line?
A. Most of it is below 972, only the northwest corner of it is above 972, a small portion of it.
Q. What is the contour line which follows along close to the black dotted line?
A. 970.
Q. What is the black dotted line?
A. That is the edge of the permanent marsh as shown by the United States Geological quadrangle, the advance sheet of the United States Geological quadrangle of White Rock.
Q. That quadrangle is already in evidence here—and there appears to be a sort of ravine or draw running up from the southwest quarter of Section 21?
A. Well, it is this marsh continuing straight north.
Q. Is there a bridge through the railroad grade on that quarter section?
A. Yes, there is a twenty-four foot bridge.
Q. Is that across this ravine that comes up from the southwest quarter?
A. That is one of the railroad bridges in this marsh.
1427 Q. Is any part of that northwest quarter of 21 under cultivation so far as you observed?
A. I didn't observe any.

Q. What was its appearance as to periodic overflow?

A. I should say that all of that northwest quarter is subject of periodic overflow.

Q. Can you tell us something of the southwest quarter of 21?

A. The southwest quarter of 21 is very similar to the northwest quarter. The east portion of it is marsh and the west portion is somewhat higher land.

Q. This draw passes through the southwest quarter, does it, on the westerly side?

A. It is the continuation of the marsh in the northwest quarter of Section 28.

Q. Are there some railway bridges there?

A. There are two railway bridges in this quarter.

Q. As indicated on your map here, Exhibit No. 28?

A. Yes.

Q. Was there any part of that land under cultivation?

A. I don't remember any.

Q. Were they any buildings upon it?

A. I didn't see any.

Q. What was its appearance as to being subject to periodic overflow?

A. Well, I should say during extreme high water it would all be flooded.

Q. And that quarter is mostly below what contour lines?

A. It is all below 973, and the greater portion of it is below 972.

Q. On the easterly side appears a black dotted line between the two brown lines. What does that indicate?

A. That is the east line of this marsh, the east edge.

Q. That is the easterly side of the permanent marsh?

A. Yes sir.

Q. And that dotted line between the brown lines appears to run around an el-iptical shape of land there. What is that land in between?

A. That is a knoll.

Q. Land slightly higher?

A. About two feet higher at the edge.

1428 Q. What is the highest point that it rises to though?

A. Some over two feet above the edge of the marsh.

Q. To what contour line?

A. To somewhat above 972.

Q. Now take the northeast quarter of 21 and describe that?

A. The northeast quarter of 21 is flat, rather low land with one overflow channel running north through the center.

Q. Was any of that land under cultivation?

A. I didn't see any.

Q. What is the nature of the improvements on it?

A. In the southeast corner there was a set of buildings and a grove.

Q. What was the character of the buildings?

A. Well, they appeared not to have been occupied for sometime, and they were not in the very best of shape.

Q. Large or small buildings?
Q. Average; that is fair.
Q. Painted or unpainted?
A. I don't remember. They didn't appear in very good condition. Didn't seem to have been occupied for some time.
Q. The northeast quarter of 21 apparently subject to periodic overflow or not?
A. I should think that the extreme high water would cover it.
Q. What do you mean by extreme high water?
A. Well, for instance, such water as in 1916, such as the highest water in 1916 and possibly other years.
Q. Now the southeast quarter of 21?
A. It was very similar in character to the northeast quarter and has the same draw running through the center.
Q. Some buildings on it?
A. One set of buildings.
Q. What is the character of those?
A. Those are very similar to the buildings in the northeast quarter.
Q. Painted or unpainted?
1429 A. I don't remember, but they appeared not to have been occupied for a considerable time.
Q. Any evidence of cultivation of the land?
A. I didn't see any.
Q. Evidences of overflow of the land?
A. Yes, there was both in the southeast and northeast quarters.
Q. Is there a road along the east line of Section 21?
A. Yes sir.
Q. Traveled?
A. At certain times.
Q. What condition is the road in?
A. Fair. Of course at the time I was there is was poor; that is the road was hard to travel on account of the wet condition of the land.
Q. Now take the land in 22, extending from the east line of 22 over to the Bois des Sioux river. What shape was that in?
A. Near the west line of Section 22 the land is about the same elevation there as in the northeast and southeast quarters of 21, and similar in character. It slopes gradually to the channel.
Q. From the dotted line over to the channel how is it?
A. Well, it is really part of the river channel. In using this expression "permanent marsh" I would say that this is a marsh which would be permanent except in very dry years. It might be cultivated extremely dry years, but under ordinary conditions it would be considered a permanent marsh.
Q. And is it so marked on the government quadrangles?
A. Yes sir.
Q. And does that apply to such lands as you have marked on the map, exhibit No. 26, as marsh?
A. Yes sir.
Q. Take Section 17, the east half of Section 17, which I believe

is about all that is in this yellow shaded area of Complainant's Exhibit 1?

A. There is an overflow channel—well that is what is called the west channel. It is forked near the south line of Section 17 so it has two branches, each having a bridge.

1430 Q. Those are the two bridges indicated near the southwest corner of the southeast quarter of 17?

A. Yes sir.

Q. What is the size of those bridges?

A. There is a ten foot wooden bridge, and a thirty-two foot wooden bridge.

Q. Those you say span the two forks of this west channel?

A. Yes sir.

Q. Did that channel have water in it when you were there?

A. Yes sir.

Q. Which way was it flowing?

A. North and northeast.

Q. And that channel you say extends on through the southeast of 17?

A. Yes sir, going in a northeasterly direction.

Q. How wide is it?

A. It varies from 100 to 200 or 250 feet.

Q. Any buildings on the southeast quarter of 17?

A. One set of building- near the southeast corner of this quarter.

Q. Are those what have been mentioned here as the Mr. Cleary buildings?

A. I don't know the name.

Q. Are the buildings occupied?

A. Yes sir, they were at the time I was there, and seemed to be in very good condition and of a good character.

Q. Rather prosperous looking place?

A. Quite so, yes.

Q. Was the land under cultivation, the southeast of 17?

A. Part of it.

Q. Apparently subject to periodic overflow?

A. Those portions near this channel.

Q. And the northeast of 17?

A. It is quite flat land. The same channel running through the southeast quarter also goes through the southeast corner of this northeast quarter.

1431 Q. Any buildings on that quarter?

A. I didn't see any.

Q. Land under cultivation?

A. I didn't notice any cultivation.

Q. Was it cut for hay?

A. I should think so. I didn't notice.

Q. By the way, is there a railroad bridge where the railroad crosses this draw in 17?

A. Yes sir, I think so.

Q. What sized span?

A. I don't know, but on the east line of this quarter there is a twenty foot bridge.

Q. Across the north and south road?

A. Yes sir.

Q. What would you say as to the northeast quarter of 17 being subject to periodic overflow?

A. Portions of it near the channel would be.

Q. Now section 16, beginning with the northwest quarter?

A. The same channel from Section 17 continues over through the north half of this quarter and the land in general is fairly low or quite low.

Q. Was it under cultivation?

A. I didn't notice. I don't think there was any portion. If it was it was a very small portion of this quarter.

Q. Were they any buildings or improvements upon that quarter?

A. I didn't see any.

Q. What would you say as to the land being subject to periodic overflow?

A. Well, portions near the channel were.

Q. And the balance of it?

A. There is some high land in the south portion of the quarter.

Q. Now the southwest quarter?

A. The southwest quarter has considerable hay land. I didn't see any cultivated land, although there might have been. That is, I don't remember of any.

Q. Is any portion of that marsh?

1432 A. Near the east line there is; a portion of that quarter the marsh extends through the whole eastern half of this section 16.

Q. Any buildings on the southwest quarter?

A. I didn't see any.

Q. Any of the land under cultivation?

A. As I stated before there may have been, but I don't remember.

Q. Some hay land there you observed?

A. Yes sir, a pasture.

Q. What would you say as to that land being subject to periodic overflow?

A. Part of it would be subject to overflow, I think. There is portions of it, even is the west part, that is lower than indicated by the contours, somewhat lower.

Q. I should judge by the contours it was rather flat below contour 972?

A. Above contour 972.

Q. Now the northeast of 16?

A. It is practically all marsh.

Q. Any buildings on it?

A. I didn't see any.

Q. Any evidence of cultivation of the land?

A. I don't think so. It is all marsh as far as I could see and grown up to cattails or water weeds.

Q. And the southeast quarter?

A. That is also in the marsh, and grown up to water weeds.
Q. Any buildings on it?
A. There is a house near the south line.
Q. Occupied?
A. It was not occupied at the time I was there.
Q. Was there any sign of cultivation?
A. I didn't see any cultivated land in that quarter. It appeared one mass of water weeds.
Q. What would you say as to its being subject to periodic overflow?
A. It think it has always overflowed, that is every year.
1433 Q. Now there is a small quantity of land in Section 15 westerly of the Bois des Sioux river, did you observe that?
A. That is all low land.
Q. Part of this same marsh?
A. Yes sir.
Q. Any of it cultivated?
A. I don't think so, about a foot of water there when I was there.
Q. No improvements?
A. I didn't see any, no.
Q. There seems to be in this yellow shaded area of Complainant's Exhibit 1, a greater portion of the southeast quarter of section 8, that is all except a small tract in the northwest corner of that quarter. Will you describe that is near as you can recollect it?
A. The southeast quarter of Section 8 is rather flat land and may be subject to overflow in extreme high water.
Q. From what?
A. From the draw or channel in the northwest corner of section 16 which joins the Bois des Sioux channel in Section 9.
Q. Any buildings on that quarter section?
A. I didn't see any.
Q. The land under cultivation—did you notice?
A. I don't remember.
Q. Passing now to Section 9, which appeared to be all in this shaded area, tell us about the northwest quarter?
A. The northwest quarter of section 9 is flat land sloping gradually toward the channel of the Bois des Sioux. Somewhere near the center of that there is a set of buildings that did not appear to be occupied at the time. It is evidently all subject to overflow, or nearly all; that is at the extreme high water.
Q. Any of that land under cultivation?
A. I did not see any. I don't think there was any.
Q. Now the southwest of 9?
A. The southwest of 9 is similar to the northwest quarter, flat and low and almost all of it subject to overflow at extreme high water.
1434 Q. Have any buildings on it?
A. I didn't see any. I don't think there is any.
Q. Any evidences of cultivation of the land?
A. No, I didn't see any cultivation on this quarter.
Q. On the northeast of 9?

A. The portion that is westerly of the river is close to the river channel. It is low and subject to overflow, all of it.

Q. Any buildings on it?

A. No.

Q. Any evidences of cultivation of the soil?

A. No.

Q. The southeast of 9?

A. Similar to the northeast quarter. No buildings, and almost all of it is permanent marsh.

Q. That is it is below this dotted black line?

A. Yes sir.

Q. Which you say is indicated as a permanent marsh on the government quadrangles?

A. Yes sir.

Q. Now how far to the north do these government quadrangles show this area?

A. It shows it—that is the advance sheet shows it only to the center of Section 9.

Q. How then did you establish the permanent marsh area from the east and west quarter line of section 9 northwardly?

A. By continuing at what I thought would be the flow line as used by the government engineers. This flow line drops gradually with the river.

Q. Did you verify that by an observation of the land?

A. Well, the line shown as the permanent marsh line, is lower than the marsh line as I observed it, of course, because I saw a much wider area was grown up to water weeds than what is indicated by the black dotted line.

Q. That is you fixed it at what you thought should be properly the permanent marsh line in ordinary times rather than what is shown by the conditions there at present?

1435 A. Yes sir, that is I established it according to the same flow line as close as I could estimate it as was used by the government surveyors.

Q. Now it is in this east portion of Section 9 that you say the westerly overflow channel, if I may call it that, merges with the Bois des Sioux river?

A. Yes sir.

Q. Now passing northward to Section 4, all except a small portion along the westerly side seems to be in this yellow area, that is the part below about contour 970. Describe that, Mr. Nelson.

A. That is land having a uniform slope to the channel.

Q. What channel?

A. The Bois des Sioux channel.

Q. Its character?

A. Well it has a gradual slope from elevation 971 down to the level of the channel. It is flat.

Q. The northwest quarter of 4, any buildings or improvements on that?

A. I don't think so, no.

Q. The land under cultivation?

A. There may have been some, yes.
Q. Any of it have hay on it?
A. No, I don't think so, not to any large extent.
Q. What is the character of this below contour 969 that you have marked marsh?
A. Well, that is within the area that would be permanent marsh.
Q. Now the land in the northeast of 4 extending over to the river channel?
A. Is low and subject to overflow—a part of this marsh.
Q. The southwest quarter of 4?
A. The southwest quarter of 4 slopes uniformly to the Bois de Sioux channel.
Q. There seems to be a ravine or draw coming in there from the west?
A. Yes, there is a twenty-two foot bridge on the west line of section 4.
Q. West line of the southwest quarter?
A. Yes sir.
Q. That spans this draw coming in from the west?
A. Yes sir.
1436 Q. Is that a creek?
A. It is a dry run, as we call it. It was dry at the time I was there.
Q. That seems to cross the railroad grade in the north part of Section 8, spanned by a railroad bridge, is it?
A. Yes sir.
Q. Any buildings on the southwest of 4?
A. No.
Q. Any cultivated lands?
A. There may have been some. I don't remember.
Q. Land bear evidences of overflow?
A. The east portion of it. Well, the larger portion of it, all except the land near the west line.
Q. Now the land in the southeast of 4 over to the river channel?
A. It is all low land and almost all of it or the greater portion of it within this marsh.
Q. Within the permanent marsh limits?
A. Yes sir.
Q. Now you understand that I have heretofore questioned you in regard to the land in the southern portion of Fairmount township, which would be Township 129-47?
A. Yes sir.
Q. I ask you now about the land in the northern portion of Fairmount township, which would be township 130, range 47? Passing northerly there appear to be on this Complainant's Exhibit No. 1, within this yellow shaded area, land in 33 below this contour No. 970. Describe that?
A. That land is subject to overflow, I think up to the contour line of 970.
Q. And a larger part of it within this permanent marsh area?
A. About two-thirds of it within that area.

Q. Any buildings on that land?

A. I didn't notice any. I was told there was some, but I don't remember the location of those buildings.

Q. Is that where the Bois des Sioux river widens out and forms what they call Mud Lake?

A. That is the beginning of it, the southern end.

1437 Q. That is opposite this section 33, you mean?

A. Yes. I think that starts in the northeast quarter of Section 33.

Q. Did you see any evidences of the cultivation of this land in 33?

A. Not below contour line 970. Portions of that might have been but it didn't appear so when I was there.

Q. Now in section 28 there appears to be a small portion of the easterly half of that within this yellow area. What would you say of that?

A. I would say that about two-thirds of that east half of section 28 would be flooded in extreme high water. About one-third of it is within this permanent marsh area.

Q. Any buildings on it?

A. There is a set of buildings in the northwest corner of the northeast quarter.

Q. Well, that would not be within the part subject to overflow?

A. No, I should say not.

Q. Well such part as you say would be subject to overflow, such part as is below this black dotted line—are there any buildings on that?

A. No.

Q. Any evidences of cultivation?

A. I didn't see any. Of course it may have been cultivated, but at the time I was there it didn't show any signs of cultivation because it was all grown up with water weeds.

Q. Now section 27—there appears to be about half of the southwest quarter of 27 on the westerly side of the Bois des Sioux river. What is the character of that?

A. That is in the marsh area.

Q. Any buildings on it?

A. No sir.

Q. Bear any evidences of cultivation?

A. I couldn't see any.

Q. And you say that is altogether within the limits of this permanent marsh?

A. Yes sir.

Q. Any buildings on it?

A. No.

1438 Q. Any evidences of cultivation?

A. I didn't see any, although there may have been.

Q. Now passing northerly, there appears to be within this yellow area the southeast corner of the southeast quarter of section 2. What is the character of that land?

A. There is a very small portion of it within the area of what I would call a permanent marsh, but approximately one-third of it in

the eastern part of it would be subject to overflow in extreme high water.

Q. Any buildings on that quarter section?

A. No; at least I didn't see any.

Q. Were there any cultivated lands in this southeast corner of that quarter?

A. I don't think so. I don't remember any.

Q. Now over in the southwest of 22—that appears within this yellow shaded area?

A. The greater part of that is in the marsh area and all of it I think is subject to overflow in very high water.

Q. Any buildings on that quarter?

A. No, I don't think so.

Q. Any evidences of cultivation?

A. No, not as I remember.

Q. Now there appears to be a little of the southeast quarter of 22 westerly of the river—what about that?

A. That east portion of the southeast quarter of 22 is low and very close to the river, and is in the permanent marsh area.

Q. Now there appears to be in this yellow area a large portion of the northwest quarter of 22. What is the character of that?

A. About half of that northwest quarter of 22 is within what I call the permanent marsh area, and about two-thirds of it is subject to overflow in extreme high water.

Q. Any buildings on that quarter?

A. I think there is a set in the southwest quarter.

Q. Occupied?

A. I don't remember.

Q. Any of the land cultivated?

A. I think there is a strip along the west line although I am not quite sure of it.

1439 Q. Now such part of the northeast of 22 as is westerly of the river—what is the character of that?

A. It is low and within this marsh area.

Q. There appears to be the east half of section 15 within this yellow area. What is the character of that land?

A. That is very close to the river and a large portion of that is the permanent swamp or marsh area, I think.

Q. Any buil-ings on that?

A. I don't remember of any.

Q. Any of the land cultivated?

A. Not in the east half of Section 15, not as I remember.

Q. Did you observed these lands to the north of Section 15 in section 10 just westerly of the river, spoken of here, part of them, as the Schouweiler *land* lands or tree claim?

A. There is a strip along the river in both 15 and 10 that appeared to me to be in the swampy area, but it gradually runs out toward the north line of section 10.

Q. Any buildings there?

A. No, I don't remember of any, not in the east half, I don't think.

Q. The land being cultivated?

A. I don't think there was any cultivated land in the east half of either section 10 or 15.

Q. Now Mr. Nelson, viewing this land through this Bois des Sioux valley within the portion shaded yellow on this map, Complainant's Exhibit 1, what lands, as respecting the contour lines, would you say could be cultivated in years of ordinary high water?

Mr. Pinkney: Objected to as calling for a conclusion of the witness on a matter he knows nothing whatever about.

Q. That is, below what contour lines would the lands apparently be subject to periodic overflow?

Mr. Pinkney: If that is your question I won't object to it, but if you are going to tack it on to the former question I will object to it.

Mr. Palmer: We will leave it that way.

1440 Mr. Pinkney: I will let the objection stand to the entire question.

A. Of course the flood line drops in elevation as it proceeds north and it depends on where you are to what elevation the land would be overflowed. Beginning at two miles south of White Rock portions of that land, up to the elevation of 975.5, would be subject to overflow and the flood line would gradually drop in elevation until at Fairmount the flood line would be approximately 969, or a drop of about six feet or more between these points.

Q. Now your map, Exhibit 28, seems to show various channels, but to make it plain, how many of these flood channels are there extending across this area in addition to the Bois des Sioux channel proper?

A. At the White Rock road—that is along the north line of Sections 8, 9 and 10 there are three distinct channels in addition to the main channel of the Bois des Sioux and these channels continue—the most easterly channel proceeds northerly through section 4 and converges into the channel of the Bois des Sioux in the north portion of Section 34. The center channel joins the channel of the Bois des Sioux in the marsh in the east half of Section 16. What is called the west channel, through sections 5, 32, 29, 20, 17 and 16, and joins the main channel of the Bois des Sioux in the southeast quarter of Section 9, all in township 129-47.

Q. Now the lands not subject to overflow through that area, speaking particularly of the part through which these channels run is what land?

A. That constitutes the higher knolls or which in flood times would be called islands.

Q. Between these channels?

A. Yes sir.

Q. Now passing to defendant's Exhibit No. 4, that exhibit was made by you?

A. Yes sir.

Q. From what?

A. From data collected by me, data, as stated before, collected

from ditch surveys in this region, with checks by me as stated before.

Q. What are the brown lines?

A. Brown lines show contours at one foot intervals.

Q. Then, as I understand it these are one foot contour lines that appear upon this exhibit?

1441 A. Yes sir.

Q. You have indicated here, extending from the extreme right of this map from what is apparently the bridge of the Great Northern Railway company, the Upper Mustinka river, over to the point where it joins Twelve Mile creek at the Neumann farm, as has been described here, and have marked it the Upper Mustinka river?

A. Yes sir.

Q. Now I ask you what are the black dotted lines running practically at right angles with the contour lines beginning clear over to the right hand side of the map and extending practically all along the northerly side of the Upper Mustinka river from Section 20 in the town of Gorton to Section 1 in the town of Monson?

A. Those lines indicate the general location of flood channels or rather flow channels—that is channels through which water flows in flood times.

Q. Overflow channels?

A. No, they would not be called overflow channels. They would be called flood channels or flow channels.

Q. And do they correctly indicate the course and direction of the flow of the surface water?

A. Yes, in general.

Q. Now do all of those little flood channels which appear to be very numerous bear evidence of continuous passage of the water to the northwest?

A. No, they are only channels which take water in extreme high water in the Upper Mustinka overflow times.

Q. What I mean, what made them, Mr. Nelson?

A. The overflow water from the Upper Mustinka I should say.

Q. Do they bear evidence of recent use by the water in its passage to the northwest?

A. I think there is some water in those channels every year.

Q. Flowing water to the northwest?

A. Flowing in the general direction of the drainage which is to the northwest.

Q. Would you say from the character of these channels, their depth and general appearance that the normal flow of surface water practically each spring is in that direction all through those?

1442 Mr. Bronson: Objected to as calling for an opinion of the witness, without any foundation laid.

Q. Could you tell—could you form an opinion from what you saw there, Mr. Nelson, as to the matter I asked you about in the last question?

A. Of the general flow of the drainage?

Q. Yes.
A. Yes sir.
Q. What would you say?

Mr. Bronson: Objected to on the same grounds, calling for an opinion and not for actual statement of facts from observation made; on the further ground that it does no- presume to be on its face a hyp-thetical question to the witness, but asks for an opinion, and at the same time asks for actual observation.

A. The physical facts as shown on this map are indications of the direction of the drainage.

Q. Mr. Nelson, I direct your attention particularly to the northerly portion of such area as is enclosed within the northerly bend of Twelve Mile creek from this point near the Northeast corner of Section 19 in the town of Redpath to where it crosses the south line of Section 14 in the town of Monson, and will ask you what is indicated by the black dotted lines extending across the northerly portion of that?

A. Channels similar to those previously spoken of.
Q. And extending in what direction, the flow?
A. In a general southwesterly direction.
Q. Into what?
A. Into the Mustinka river.
Q. Those flow channels show the direction of the flow to be what?
A. Westerly and southwesterly.
Q. Whether those flow channels bear evidence of recent use—passage by the water?

A. Yes, I think water flows in them each year.

1443 Q. Passing now to the northeast corner of Section 12 in the town of Monson immediately south of this so-called Teske farm in the southeast quarter of Section 1 of Monson. What is that black dotted line extending from the river line easterly and then northeasterly up into about the center of Section 6 into the town of Redpath?

A. This is a draw running from Section 6 into the Mustinka river.

Q. A map has been submitted here by the witness Ralph, marked Complainant's Exhibit No. 5, which appears to show that channel as extending from the east lot line on the westerly side of Section 6 northerly and thence turning northwesterly into a flow channel about the middle of the west line of the northeast quarter of Section 1?

A. I followed both channels into section 6 and found no connection between them. I found some high lands separating these channels substantially as indicated here on this Defendant's Exhibit 4.

Q. The line of those two channels is apparently marked by the contour line 999?

A. Yes sir. There is probably some high land near the buildings shown on this map.

Q. Does this contour 999 mark the lowest elevation there?
A. No, that is the highest foot elevation, that is in even feet.

Q. And were you able to observe there any channel whatever connecting those two flow channels?

A. I could see no channel. I followed both channels through section 6 and could see no connection between the two.

Q. The southerly one in the southwestern portion of section 6 flows where?

A. Flows into the Mustinka river.

Q. And the one in the northwesterly portion of section 6 flows where?

A. Westerly into a draw running into the Tintah slough, or connecting with the Tintah slough.

Q. Now did you find evidences of the passage of overflow water from the Mustinka river along the east line of the southeast quarter of section 1?

A. As indicated here by contour lines there is a slight depression in the general elevation of the land at about the middle of the east line of the southeast quarter of Section 1 which has an elevation of about 998 through which overflow water would pass in case the water would raise to an elevation above this.

1444 Q. An- what is the direction of the flow?

A. Northwesterly through Mr. Teske's pasture into a small lake running northwesterly through the north half of this southeast quarter.

Q. You found that little elongated lake that has been spoken of north of Mr. Teske's place?

A. Yes sir.

Q. And what is the direction of flow from that?

A. It is northerly through the northeast quarter of Section 1.

Q. And into what?

A. Into the Tintah slough.

Q. And from there?

A. Thence north and northeasterly into the Rabbit river.

Q. Did you observe running northerly and northeasterly from the Tintah slough this Judicial Ditch No. 3?

A. Yes sir, I ran lines of level along this ditch.

Q. What fall has it, do you recollect?

A. Well, the ground has practically no fall for about four miles north from the north line of Section 31-129-45.

Q. What fall had the ditch—some?

A. Approximately one foot to the mile.

Q. Did you measure and record the size of this ditch?

A. Yes.

Q. You may state what it is?

A. It has a bottom width of eight feet, a side slope of one to one, and the ditch has a twenty-four foot bridge on the north line of section 8, at the northwest corner of section 8.

Q. What is the depth of the ditch?

A. Approximately nine feet.

Q. Mr. Nelson, during your field work and preparation of these various exhibits did you have occasion to cover this area represented by the light blue shown on Complainant's Exhibit 1, called the "delta zone"?

A. Yes sir.

1445 Q. How thorough was your examination of that?

A. Well I ran many miles of levels through this district north and south and east and west from a line of bench levels that I ran from Wheaton to the government bench mark in the southwest corner of section 16, near Norcross.

Q. And that work of leveling formed the foundation of your five feet contour lines that you have indicated on Defendant's Exhibit No. 6?

A. Yes, through this area; also through this area I used the data from the ditch survey, checked by me as previous- described.

Q. What did you observe in this area called this delta zone?

A. Do you mean as to the character of the land?

Q. Yes, the character of the land?

A. The area in general is an area of smooth land having a general slope of from two to five or six feet to the mile.

Q. In what direction?

A. The general direction of the fall is towards the north and northwest, and certain portions towards the west, but in general it is towards the north.

Q. As to its natural drainage?

A. In the portions surrounding this state ditch No. 19 there is some low land what has here been called the Redpath sloughs, but outside of this area it is smooth, uniform sloping surface, or nearly uniform, more uniform in the center of this area than towards the outlying edges or portions. The outlying portions have more tendency towards shelving.

Q. Now as to its natural drainage, whether it is well or poorly drained naturally?

A. Being comparatively very smooth land it should be easily drained land in general.

Q. And you found and have mapped here these lines of natural drainage called Twelve Mile and Five Mile creek and the Upper Mustinka river?

A. Yes sir.

Q. Now did you find between those any of these flow channels?

A. Like these north of the Upper Mustinka river?

Q. Yes, such as you have mapped here on Exhibit 4 north of the Upper Mustinka river?

A. There are no channels of that kind to any extent, except through the sections near state ditch No. 19, but they are not as well marked as north of this Upper Mustinka river.

1446 Q. As to the state of cultivation of those lands in that area?

A. With the exception of three or four square miles——

Q. Where?

A. In the area surrounding or along State Ditch No. 19 the land appeared to me equivalent to land surrounding it in the surrounding towns of Gorton, Logan, Dollymount and could be compared to those lands.

Q. Any cultivated lands and improvements?

A. Yes sir.

Q. How about farm buildings?

A. I should say the farm buildings were on the same level or should be of nearly the same general value as the lands surrounding it, or very nearly so.

Q. The farm buildings as numerous as in the other surrounding agricultural communities?

A. I think there are just as many as in the surrounding townships except perhaps the eastern portions of the townships in Traverse county. But I could see no great difference between the distribution of the farms. I think, or it appeared anyhow that the average number of acres would not differ very much—the number of acres belonging to each farmstead.

Q. These lands just north of the Mustinka river where you have indicated these flow channels passing northwesterly, were those under cultivation very extensively?

A. No, not in certain of those sections. There are certain sections, such as sections 4 and 5 that don't appear to have any cultivated land in Redpath township.

Q. Was it more easy to distinguish and map these flow channels where the lands were not cultivated?

A. Yes, I think it was. They are more easily traced through lands that are not cultivated.

Q. I want to call your attention to Defendant's Exhibit No. 73, being the special map of the flood plain of the lower Mustinka river below the outlet of the new cut-off ditch. Is that made by you?

A. Yes sir.

Q. Does it correctly show the limits of the flood plain?

A. I think so.

Q. I want to ask particularly about the conditions below the railway bridge of the Chicago, Milwaukee and St. Paul Railway,
1447 northwest of Wheaton. Now passing down stream two or two and a half miles, is there any rim or ridge across the river channel?

A. I didn't see any.

Q. That is, I mean a natural rim or ridge there?

A. I didn't see any.

Q. Did you make an examination of conditions there?

A. I ran levels along the river down to the southwest corner of Section 23 along the channel, and I could see no such rim.

Q. Did you make an examination of the conditions northwesterly of the railway bridge where it crosses the main Mustinka river, where, I think it has been testified, there was a new trestle put in in 1916?

A. Yes sir, I ran some levels over to this bridge.

Q. What did you find with respect to a flow channel of the water through that bridge southwesterly?

A. This channel which runs under this bridge continues in a general southwesterly direction and joins the Mustinka river in the northeast quarter of Section 23-127-47.

Q. Now is there still another channel northwesterly of the one last described?

A. Yes sir, there is a dry run coming from above, from north-

easterly of this railroad and running in a general southwesterly direction directly into the Lake Traverse or that portion of it which is called Mud Lake.

Q. It doesn't converge into the Mustinka channel at all then?

A. No sir.

Q. What is this indicated southeasterly of Wheaton, the stream there on this Exhibit No. 73?

A. That is what is called eighteen mile creek.

Q. Does that converge into the Mustinka below the outlet of the state ditch?

A. No, it joins the Mustinka river in the southwest corner of Section 23, perhaps a mile above the lower end of the Mustinka ditch.

1448 Cross-examination.

By Mr. Bronson:

Q. As I understand you, Mr. Nelson, your experience and observation covering this territory you have described both in the Bois river and on the maps you have shown here has been during the periods you have mentioned in direct examination of about 120 days?

A. Sixty days of field work.

Q. In the year 1917?

A. Yes sir.

Q. Prior to that you had not——

A. No, I had never been in that territory before.

Q. Now generally speaking, found that the land in this yellow shaded area along the Bois des Sioux river, at the time you made visits there this summer and up to the present time, is generally in very good condition?

A. Portions of it is good farming land and other portions are not.

Q. Now, as I understand you, there are considerable portions of that which you term permanent marsh or swampy lands?

A. Yes, from the indications I saw there I would say that considerable portions of it were.

Q. From the indications that you found there this year—but what were those indications?

A. The growth of water weeds.

Q. Cat-tails?

A. Yes sir, and various other water weeds such as wild rice.

Q. And that covers a considerable extent or portion of the territory in North Dakota in this yellow shaded portion?

A. Such areas as described in the testimony.

Q. And that is true also of South Dakota, in a way?

A. Yes sir.

Q. And from the descriptions that you have given of this land, as you have gone from quarter to quarter and section to section, and as your map shows, there would be probably two-thirds of it

at least that would come within the designation of what you have termed "marsh"?

1449 A. No sir, I don't think so. As shown on the map here these portions referred to as islands have considerable extent.

Q. Well on this exhibit that you have prepared, Defendant's Exhibit 28, you have in this portion of territory which, on complainant's Exhibit 1, is designated in yellow, in this map you have designations of "marsh"?

A. Yes sir.

Q. And do those designations that you have indicated on the map of "marsh" mean that it is marsh land?

A. I would consider them so, yes. I would consider that that area inside these black dotted lines would be overflowed each year, though they might in extremely dry years be cultivated.

Q. But generally speaking, by your indications here on this map of the word "warsh" at different places as it appears on the map in this yellow designated territory as shown on Complainant's exhibit 1,—and this map covers that does it not?

A. Yes sir, it includes all of that area within those lines north and south.

Q. The word "marsh" includes that land within the area or boundaries of where the word "marsh" appears?

A. Yes sir.

Q. And this map discloses in that yellow shaded territory a considerable portion of this land to be "marsh" in accordance with the indications of your map, does it not?

A. Yes.

Q. That is Defendant's Exhibit 28?

A. Yes sir. There is considerable portions. Perhaps in order to make a percentage of it you would have to describe the boundaries of it.

Q. But the map substantially represents what you have described in your evidence to be marsh land?

A. Yes sir, that included within those black dotted lines, or what I would consider as subject to overflow at highwater each year, and these lines I have checked from the United States Geological Survey.

Q. Now when you have designated these lands as marshy lands because they are subject to overflow do you mean in stages of high water?

1450 A. As I said before I think they might be cultivated in extremely dry years, but otherwise not.

Q. Not in normal years?

A. That is not in an average year. That is, not exclusively. They might be cultivated at certain portions of the year.

Q. Would it be your opinion that the lands that you have designated as marsh on Defendant's Exhibit 28 would not be capable of cultivation every year?

A. Every normal year?

Q. Every normal year up to the year 1915?

A. I should not think so.

Q. Or any part of them?

A. As I stated before they might be cultivated in extremely dry years, but not otherwise.

Q. And when you speak of high water, being subject to overflow in high water, what do you mean by that?

A. High water that generally comes each year; that is nearly each year or every year, the annual rise of the river in the spring or which usually comes in the spring.

Q. So by your term of stating that these lands are subject to overflow in times of high water comprehends the yearly rise of waters in that region when it is not an extremely dry year or season?

A. Yes sir, the yearly flooding of these lands except in an extremely dry year.

Q. You do not pretend to make any statement of the actual conditions there prior to the year 1917, not having observed them?

A. I am judging from the indications on the land.

Q. From inferences you make from the indications that the lands themselves disclose?

A. Yes sir.

Q. Now you have made also a thorough examination of this territory designated as the delta zone?

A. I have run levels across this territory north and south and east and west on various section lines.

Q. You have traversed it pretty well and have observed the lay of the land, made your flood plains and prepared your maps?

A. Yes sir.

1451 Q. And you found this land in the delta zone, generally speaking, to be well cultivated land?

A. With the exception of those portions as indicated.

Q. Those Redpath sloughs and the Tintah slough?

A. Yes, and those sections I said that have those flow channels, that is a large number of flow channels.

Q. And that would be in what sections?

A. Sections 4 and 5, perhaps some in Section 10, part of Section 15 and part of Section 16, all in the town of Redpath.

Q. Now with those exceptions that you have excluded, you found this land to be well cultivated, well-tilled and well-farmed from indications that were apparent to you?

A. They were as well cultivated as the lands in the surrounding townships, as I said before.

Q. And as compared with these lands in the yellow shaded territory along the Bois des Sioux river they were better cultivated, were they not, than those seemed to be?

A. As I stated before there is portions of this land in the Bois des Sioux valley which is the upper or higher portions of these Knolls, that are well cultivated lands.

Q. You still haven't answered my question, because I was asking you as to the general situation and both of them comparatively.

A. It depends somewhat on the limits you set to this area.

Q. Mr. Nelson you have described in your direct examination section after section and quarter after quarter in this so termed yellow designated territory in North Dakota, have you not?

A. Yes sir.

Q. And generally speaking are those lands that you observed there in 1917 in this yellow designated territory, and which you have described, as well cultivated and as suitable for cultivation as these lands over in the delta zone in 1917?

A. If you exclude the Redpath slough I would say that the lands in the so-called delta zone are better cultivated and have more on the average better improvements.

Q. For the year 1917?

A. Yes sir.

1452 Q. Now counsel asked you how these lands in the delta zone compared or averaged with other lands surrounding them in Traverse county. Now I am asking you to make a comparison between those lands in the delta zone in 1917 and these lands in the yellow shaded territory which you have described section by section and quarter by quarter as to the state of cultivation in the year 1917?

Mr. Palmer: Objected to as having been already answered by the witness.

A. As I stated before in the previous question, I think with the exception of those lands I excepted in the Redpath slough and those other sections, that the area in so-called delta zone is better cultivated and improved than the lands included within the yellow area on the map, Complainant's Exhibit 1.

Q. Was it readily observable that a much greater proportion of lands in this so-termed delta zone in 1917 were under cultivation?

A. I would say yes.

Q. And were being actually farmed in the year 1917?

A. I would say yes.

Q. And crops raised on them in the year 1917?

A. Yes sir.

Q. Have you any particular portions of land this yellow designated land which you noticed were being cultivated and farmed this year?

A. There was practically all of these higher lands in these—what I state were islands in flood times that were under cultivation. There is for instance, the southwest quarter of section 33-129-47; also the west half of section 29, same township and range; southeast quarter of section 20 and part of the northeast quarter of section 32; part of the northeast quarter of section 5-12847; the east half of section 20-129-47; portions of the northwest quarter of section 3-128-47; and portions of the southwest quarter of 3-128-47; portions of the southeast quarter of section 4, same township and range. Going south of White Rock there is cultivated land in the southwest quarter of Section 10, same township and range; also in the northwest quarter of 10-128-47; portions of the west half of section 15, same town- and range. Outside of these portions I saw comparatively little well cultivated land within this yellow area.

Q. What kind of crops did you see on those lands that you have described now.

1453 A. There is some grain of each kind.
Q. Wheat?
A. Yes, some wheat, some barley, some flax.
Q. Did you see much wheat?
A. I saw some, yes.
Q. See more wheat than barley or oats?
A. Yes, I think quite a little more.
Q. And see some corn?
A. Yes, some.
Q. Fodder corn?
A. Yes sir.
Q. When you speak of the southwest of 33, that is the Lundberg place?
A. No, the J. E. Brune place.
Q. Did you see much under cultivation there?
A. Yes sir, I think the greater portion of the southwest quarter of 33-129-47 was cultivated.
Q. Cultivated this year?
A. Yes sir.
Q. And crops put in this year?
A. Yes sir.
Q. And crops harvested there this year?
A. Yes.
Q. Did you see any crops in Section 28 in this yellow shaded territory, the east half of Section 28 and the west half of section 27-130-47?
A. I didn't notice any in section 27.
Q. Did you look?
A. Yes. There might have been some on the southwest quarter, but I don't remember distinctly.
Q. That is marsh land that you have described as such?
A. Not the west portion of the southwest quarter of section 27.
Q. High land is that?
A. No, it is rather low land, but it is not the lowest.
1454 Q. But the northwest corner of Section 27 you call all marsh, do you not?
A. No, there is a portion of the northwest portion, which is not within the marsh.
Q. How much?
A. I should say about probably one-fourth of the quarter.
Q. And the other three-fourths you would call marsh?
A. The Bois des Sioux channel runs through this northwest quarter of Section 27.
Q. And the other three fourth's you would call marsh?
A. Yes sir.
Q. And not subject to cultivation in ordinary years?
A. I should think not.
Q. That is what you mean by all these descriptions when you call it marsh, not subject to cultivation in ordinary years?
A. Yes sir, that is such as stated before.

Q. What elevation do you assume Lake Traverse to be to overflow these lands in stages of high water in the yellow shaded territory?

A. As stated before the overflow line varies from the northern end of Lake Traverse to the Rabbit river, a uniform drop, or nearly uniform through this area.

Q. My question to you is, how high would the state of water in Lake Traverse necessarily be in order to overflow these lands which you have described to be subject to overflow?

A. You mean the area within the marsh?

Q. I mean the area you have described on your map as marsh and subject to overflow, the yellow shaded portion?

A. I should assume it would be approximately 975.5.

Q. That is if Lake Traverse is at an elevation of 975.5?

A. From that on up to 976.

Q. Above the sea level, it will overflow these lands in this yellow shaded territory which you have designated as being subject to overflow?

A. Yes, approximately so; approximately 975.5, or probably slightly above that.

Q. How much of that territory would it cover in the overflow then at 975.5?

A. Well, I should say it would cover that area within those black dotted lines.

1455 Q. The marsh area?

A. Yes sir.

Q. Within the black dotted lines as shown on this Defendant's Exhibit 28?

A. Yes sir.

Q. For instance, to make it specific, at a stage in Lake Traverse of 975.5 the land in Section 20 and 29-129-47 would be overflowed?

A. Those portions within this channel shown in those sections.

Q. And that portion in Section 32 likewise?

A. Within the channels as shown.

Q. And likewise in sections 33 and 28, said township and range?

A. Yes, in the southeast quarter as shown on this map.

Q. Now further, what do you assume to be the level of Lake Traverse before the Boise des Sioux river will leave its banks?

A. Which portion do you refer to.

Q. Anywheres in this yellow shaded territory?

A. As I found it, the Bois des Sioux has no well defined channel until you get up to the north line of Section 34-130-47, one mile south of Fairmount. That is where the banks start.

Q. Is there water in the Bois des Sioux river now, or was there when you were last there?

A. Yes sir.

Q. When was that?

A. In August.

Q. Was it running north?

A. Yes sir.

Q. All the way down from Section 34 down to White Rock?

A. It was running northerly from White Rock to Section 34.

Q. And in a channel?
A. Yes, well in a wide strip.
Q. Well, in a channel necessarily—it wasn't all over the fields?
A. Well, the ditch was very irregular.
1456 Q. But there was a width and a depth?
A. Yes, sir.

Q. Now to have the Bois des Sioux river in this territory from White Rock north up to Fairmount get without its banks, for instance in Section 27, 130-47, what do you assume the heighth of Lake Traverse?

A. As I said before, the indications of banks well-defined starts at the south line of 27, or the north line of 34 and it attains no great heighth during the first two miles, and it would take very little raise of the Lake in order to overflow these banks.

Q. Well, at 974 would the Bois des Sioux river be in its banks up there in Section 27 at an elevation of 974 of Lake Traverse, in your judgment?

A. I think it would have to be somewhat above 974.

Q. At 975 in your judgment would the banks of the Bois de Sioux river along Section 27-130-47 be overflowed?

A. I would think so; that is, those banks that I saw there I should think that at that elevation the banks would be overflowed.

Q. And at what elevation therefore would they start to commence to overflow—between 974 and 975?

A. To give that any closer would necessitate very accurate measurements—to give it closer and in more detail.

Q. Do you think an elevation of Lake Traverse at 977 or 976 this territory in yellow would be overflowed to the extent the yellow shows?

A. With the exception of the lands as indicated before.

Q. Do you mean to say that at an elevation of 977 of Lake Traverse these lands in the yellow designated territory, shown on Complainant's Exhibit 1, would be any of them out of water?

A. Yes, sir.

Q. And where would be the points where they would be out of water at that time?

A. There would be portions—for instance, practically all of the southwest quarter of Section 33-129-47, portions of the northwest quarter of Section 4- 128-47, portions of the Northeast quarter
1457 of section 5-128-47; the larger portion of the east half of section 29-129-47; portions of the southeast quarter of section 20-129-47; also portions of the northeast quarter of this section 20 last spoken of; portions of the northeast quarter of section 9-128-47 just west of White Rock; portions of the southwest quarter of Section 10, same town and range; portions of the northwest quarter of Section 15-128-47; and I think portions of the southwest quarter of the same section, and possibly other places.

Q. What other places?

A. There is a portion of the southwest corner of the southwest

quarter of Section 3-128-47, and I think a small portion on the southwest quarter of Section 5-128-47. That covers most of the area.

Q. Then if I understand you substantially, excepting the portions you have mentioned, when Lake Traverse is at an elevation of 977, the lands in this yellow designated portion or territory, as shown by Complainant's Exhibit 1, excepting your exceptions, would be overflowed?

Mr. Palmer: Now there seems to be a difference here as to the high water level of Lake Traverse. Our engineers and the United States Army Engineers seem to fix the high water mark at 976.6 instead of 977, and I think the witness ought to understand whether you mean the high water level of Lake Traverse as recorded, or something in excess of that. If you mean something in excess of the high water mark we shall object to it.

Mr. Bronson: It is simply relative. He has used his own figures.

Mr. Palmer: Objected to as assuming a fact not established by any testimony in the case.

Q. Now in taking these elevations you have used your own datum have you?

A. I have run lines from the United States Geological Survey bench marks and assumed their data as given in the last corrected list.

Q. Did you get any government bench marks in the years 1915 and 1916 that you used?

A. There bench marks have been established from time to time, with the corrected elevation, and I think it is given in Bulletin No. 640 of the United States Geological Survey; that is those for Minnesota, and those for Dakota are given in a different bulletin, but they are corrected up to day.

1458 Q. You were not there in the years 1915 or 1916?

A. No, sir.

Q. Now counsel has suggested something about an elevation of 976.6—what further territory would you include as not being inundated when Lake Traverse is at an elevation of 976.6?

A. Well, I don't think I assumed all that territory would be inundated.

Q. Well I assumed that you did so state—if you didn't correct and revise your testimony. What additional territory would be out of water at 976.6?

A. The lands stated, including all of those stated, as far as I could find any evidence of it that were above the high water flow line.

Q. So at 976.6 elevation of Lake Traverse the lands as I understand you, you assume in this yellow designated territory to be inundated excepting those that you have taken out?

A. Substantially so yes. There might be some slight modification of that.

Q. Also what generally would you assume to be the conditions at the Village of White Rock as to overflow with an elevation of Lake Traverse at 976.6, such elevation as we have been talking

about and understand it to be, as taken from the United States Geological Survey?

A. As stated before, in direct examination, I think I said that the area included below contour lines 974 approximately covers the area that was flooded.

Q. Does that include the territory of White Rock?

A. That is shown on the plat of the town of White Rock?

Q. Well, for instance, on Third Street in White Rock—to what extent would that be inundated at 976.6 elevation of Lake Traverse?

A. Well, as shown by this contour line 974—everything below that.

Q. At an elevation of 976.6 of Lake Traverse would a portion of Third Street in the town of White Rock be inundated?

A. Yes, sir.

Q. About how deep?

A. Well, it varies somewhat.

Q. How deep at the deepest appoximately?

A. Perhaps two feet in the portions towards First Street.

1459 Q. And would the blocks surrounding the public school in the Village of White Rock be at all inundated?

A. Portions of that block would be, yes, sir.

Q. That is on Fourth street, and Minnesota street and Dakota street to some extent around the public school?

A. Portions of those streets, yes, sir.

Q. I understand from your map here that Second street from Minnesota street south would not be inundated?

A. Yes.

Q. To what extent would it be inundated?

A. The greater portion of it would be.

Q. But not the greater portion of it north?

A. No, not going up by Highland street.

Q. That is, the corner of Second street and Highland street in this town of White Rock would not be inundated?

A. I don't think so.

Q. In your direct examination you mentioned flood channels in Redpath township indicating a general flow of water along those flow channels northwesterly, and particularly in Section 1 you have apparently designated a flow channel running northwesterly into Section 6 from near the southeast corner of Section 1?

A. The drop in the draw is from Section 6 into the Southeast corner of Section 1.

Q. And is there not a flow channel designated here to represent the overflow water what witnesses testify to going past Teske's place?

A. When the water raises above an elevation of 998 the water would flow northwesterly across the road in the southeast quarter of Section 1 into the Lake north of Mr. Teske's place.

Q. Would not that be a flow channel at a certain elevation?

A. No this area through which the water would pass in that case is a wide smooth surface and is generally called a saddle. It is a depression in the ridge. It is a local depression in the ridge.

1460 Q. Well, likewise, when you had an elevation of 1,000 or above on the upper Mustinka here and the water was going northerly over towards the Tintah slough might not these waters in Section 6 Redpath township go northerly toward the Tintah slough and northwesterly?

A. In what portions would the elevation be 1,000?

Q. At the upper Mustinka from 1,000 to 1,002?

A. In section 7?

Q. Yes, and where they were breaking over to go toward the Tintah slough?

A. If it reached a stage of 1,002 all that land would be flooded.

Q. If I understand you correctly any waters in Section 6 that reached a stage of 1,000 could pass north and northwesterly?

A. Yes.

Q. And the flow channels that you have mentioned here are where these waters are at a stage below 999?

A. If the waters reached such an elevation they would flow in a sheet across the whole country.

Q. And then you wouldn't call that condition a flow channel at all?

A. They wouldn't act under those conditions.

Q. The flow channels wouldn't act under those conditions?

A. No sir.

Q. Now in the southern portion of this delta zone you have not designated on the map here any flow channels?

A. The channels south of the Mustinka river are not as distinct. While there are some small channels there that could be followed they are not well-defined.

Q. Does County Ditch No. 10 intercept some of those flow channels?

A. Yes sir.

Q. And what effect does Ditch No. 10 have upon the flow channels?

A. It has the effect to gather the waters in these channels.

Q. East of the east line of Section 7?

A. Redpath township.

Q. And carry them where?

A. Into the Mustinka river.

1461 Q. Near the southeast quarter of Section 1, Monson township?

A. Yes sir.

Q. What effect likewise did County Ditch No. 9 have on the flow channels?

A. The same effect I should say.

Q. And state ditch No. 2? That is the cut-off and state ditch in this Redpath township?

A. Well, the state ditch itself would not gather much of this flow as very little overflows to the south.

Q. But such as did in the flow channels would be intercepted by such state ditch?

A. Yes sir.

Q. And would you say the same effect likewise would come from County Ditch No. 11?

A. Yes sir, only County Ditch No. 11 empties into a draw running to the Tintah slough.

Q. But the effect on the ditches is to intercept these flow channels?

A. Yes sir.

Q. You had occasion to observe these ditches, I presume in going over this territory this summer?

A. Yes sir.

Q. And to what extent did these ditches up in Redpath and Clifton townships serve to create any flow channels?

A. The same as any ditch would.

Q. A ditch is a flow channel is it not?

A. Yes sir.

Q. And how does any ditch create a flow channel?

A. Well, it is a flow channel if it has any drop at all to conduct water.

Q. If it operates to conduct water off?

A. Yes sir.

Q. Now you speak of this delta zone as being well-drained naturally?

A. With the exception of those portions.

Q. Of this Redpath slough that you mentioned?

A. Yes.

Q. Would you say it is as well drained as lands in Folsom township or Windsor township, towards the lake?

A. No, the land in Windsor and Folsom townships are hilly and have a steep slope to Lake Traverse.

1462 Q. And these lands have much better drainage naturally have they not?

A. Portions of them have, except the portions in the flat above the edge of the hill.

Q. You have stated that these lands in the delta zone, that is in Redpath and Clifton townships are naturally well drained, but not so well-drained generally speaking as the lands in Folsom and Windsor naturally?

A. Yes sir.

Q. Now do these ditches as constructed in Redpath and Clifton townships, as you observed them serve to operate to make a better drainage for these lands?

A. There was no water flowing in them when I was there so I don't know just how the operation is, but I judge it would improve the drainage to some extent.

Redirect examination.

By Mr. Palmer:

Q. Did you take the elevation of the arrow on the boulder on the Teney farm in Folsom township, described by the witness Daniel

M. Teney and his son, as recording the highwater mark of the waters of Lake Traverse?

A. Yes sir.

Q. When did you take this?

A. When I was there. I got the elevation two different times from different bench marks of the United States Geological Survey.

Q. What did you find the elevation of the top mark of the arrow described as mark 1?

A. 976.61, or 976.6 in even tenths.

Q. And what was your purpose in taking it from two different Geological Survey bench marks?

A. Well, I took it from a number. That is, I checked the elevation of the lake from four or five different United States Geological bench marks, and then measured the distance to the arrow from lake level.

Q. So as to verify its accuracy?

A. Yes sir.

(Adjournment taken until October 9, 1917, at 10 a.m.)

1463 October 5, 1917, at 10 o'clock a. m.

Mr. Palmer: At this time we offer in evidence Defendant's Exhibits 4, 7, 25, 26, 27 and 28.

CARL KRENZ, being sworn in behalf of defendant, testified as follows:

Examined by Mr. Palmer:

Q. Where do you live?

A. Traverse county, Redpath township.

Q. How long have you lived there?

A. I came there in 1888.

Q. What is your occupation?

A. Farmer.

Q. Describe the land on which you live in Redpath Township, Traverse county, Minnesota.

A. Southeast quarter of 7, Redpath township.

Q. That is your home farm, is it?

A. Yes.

Q. How long have you lived on that quarter section?

A. All the time.

Q. Continuously since you came to Traverse county in the year 1888 you have resided on this southeast quarter of Section 7 of Redpath Township?

A. Exactly.

Q. How much of that quarter is under cutivation?

A. I had it all under cultivation the first years but I have seeded down a part of it for tame pasture.

Q. In the early years of your residence there, then, you had it all under cultivation?

A. Yes.
Q. Later you seeded down a portion of it for tame grass pasture?
1464 A. Yes, sir.
Q. During all of the nearly 30 years that you have been there, has that quarter section been suitable for cultivation?
A. I have always farmed it, yes.
Q. You built buildings there when you first came, did you, Mr. Krenz?
A. Yes, sir.
Q. Did you do some more building later?
A. I built up right along what I needed.
Q. What improvements have you on that farm now?
A. House and barn, granary, chicken house.
Q. What kind of a house?
A. A brick building.
Q. A brick house?
A. Yes, sir.
Q. How large a house?
A. 28x30.
Q. Two stories?
A. Two stories.
Q. A two-story brick house?
A. Yes, sir, and then a kitchen in addition.
Q. And your barns, are they large barns?
A. 30x40 barn.
Q. When did you build the brick house?
A. Oh, it must be 23 or 25 years ago, I guess.
Q. Do you own and farm other land in addition to the southeast of 7?
A. Yes.
Q. What is that?
A. It is the northeast quarter of 7.
Q. How long have you owned that northeast quarter of 7?
1465 A. I bought it shortly after I came there.
Q. And did you make it a part of your home farm?
A. Home farm, yes, sir.
Q. How much of that is under cultivation?
A. That is all of it under cultivation except by the Mustinka river.
Q. How much by the river?
A. About 30 or 35 acres.
Q. And for what is that 30 or 35 acres used?
A. I got some of it in pasture and some of it in hay.
Q. Tame pasture?
A. Tame pasture and wild grass, prairie grass.
Q. And tame hay or wild hay?
A. Wild hay.
Q. How long has that northeast quarter been under cultivation aside from what you have in wild hay and wild pasture?
A. That was part open as I bought it.
Q. What do you mean by open?

A. Broken.
Q. And has been under cultivation with the exception you have mentioned ever since?
A. Yes, sir.
Q. Continuously each year?
A. Each year, yes, sir.
Q. Do you own some more land adjoining?
A. Yes, sir.
Q. What is that?
A. I own a quarter in 8.
Q. Which quarter?
A. It is the northwest quarter of 8.
Q. That would adjoin the northeast quarter of Section 7 on the east?
1466 A. Yes.
Q. How long have you owned the northwest of 8?
A. 6 or 7 years.
Q. Has that got separate buildings on it?
A. Yes, there is a small house and a granary.
Q. Who lives there?
A. It stays empty, I farm it with the home farm.
Q. And prior to the time you bought it 6 or 7 years ago, was there somebody living on it?
A. Yes, sir.
Q. Who was that?
A. First a man was on, Carl Carlson; he took it as a homestead.
Q. And did he live on it until you bought it?
A. No, he sold it to somebody else and I bought it from another man.
Q. Now, have you known this northwest quarter of 8 ever since you have been there?
A. Yes, sir.
Q. And what has been its condition as to cultivation?
A. The whole thing is under plow.
Q. Ever since you came there?
A. Only a small corner.
Q. Which corner?
A. This corner, a little island where the river goes through used for hay.
Q. In the southwest corner that would be?
A. Southwest corner.
Q. And how large a place is that that is used for hay?
A. Between 3 or 4 acres, I never measured it exactly.
Q. With that exception has it all been under cultivation?
A. Yes, sir.
1467 Q. Ever since you came there?
A. Yes, sir.
Q. Where are these buildings located on this northwest quarter of 8?
A. On the east side.
Q. Which side of the river, the old river, are they on?
A. The Mustinka?

Q. On which side of the old Mustinka river are the buildings?
A. On the east side.
Q. And the old Mustinka river runs through the southwest corner of this northwest quarter of 8?
A. Yes, sir.
Q. And just below that corner the old Five Mile creek comes in?
A. Yes.
Q. Does the water run now in the old Mustinka river through there at that point?
A. Not now, it is dry now.
Q. I mean in the springtime.
A. Yes, sir.
Q. In times of rainy weather?
A. Yes, sir.
Q. How much, what quantity?
A. Oh, full, sometimes she runs over, spread out.
Q. That is, at what times, what seasons?
A. Really in the break-ups, from snow and heavy rainfalls.
Q. And does the water still run in the old channel of Five Mile creek there?
A. Yes.
1468 Q. In what quantities?
A. Well, that part of the water wouldn't go out of the banks at all. There is the Twelve Mile creek that comes around what they call the fork and then it runs up-hill, comes back, if the water gets so high on the fork it comes back and runs southeast and filled up the low places and stayed there. I examined sometimes that I threw in a weed or some wood and it stays still there, it don't move until the water broke through somewheres and go north.
Q. Going back to your buildings there on the home farm, is there a school house near those?
A. Yes, sir, just 80 rods east from my buildings.
Q. How long has that school house been there?
A. Nearly since I have been there. It was a little bit further south but they moved it to that place and it is there yet.
Q. Always held school there, have they?
A. Yes, sir.
Q. Good roads leading to it?
A. Yes, sir.
Q. Good roads leading to your place?
A. Yes, sir.
Q. Has there always been?
A. Yes, sir.
Q. And leading to your place particularly from the east, from towards Norcross have the roads always been good?
A. Fairly good, yes, sir.
Q. Where do you get your mail, what station?
A. At Norcross.
Q. Is it brought to your place by carrier?
A. Yes, right by the school house, there is the road where they turn again and go east.

Q. How does the mail carrier travel?
A. Daily mail.
Q. How does the mail carrier travel?
1469 A. In a car.
Q. With an automobile?
A. Yes, sir.
Q. How long has he been delivering your mail there with an automobile?
A. A good many years, I can't say exactly what year he started on the mail route.
Q. And he has delivered the mail to your neighbors in that same locality, I suppose, also?
A. Yes, sir.
Q. Do you own some land there in that locality?
A. I had a quarter in 18 but I sold that to the boy.
Q. What quarter in 18?
A. It is a fraction, in lots.
Q. What would it be corresponding to?
A. The northwest quarter of 18.
Q. Corresponding to the northwest quarter of 18; you owned that?
A. Yes, sir.
Q. And when did you buy that?
A. It was 6 or 7 years ago.
Q. Are there buildings on there?
A. There was small buildings on there as I bought it but they wasn't much account. I put up bigger buildings, house and barn.
Q. For the boy?
A. For the boy.
Q. How long ago did you sell the farm to the boy?
A. 3 years ago.
Q. This northwest quarter of 18, what has been the condition of that land as to cultivation since you knew it?
A. There was a part of it broken up and a part of it was in hay but now it is all in field.
1470 Q. All in cultivation?
A. All in field and a little pasture.
Q. Has it always been such land as could be cultivated ever since you came there?
A. Yes.
Q. Did you own some land over in Section 8 except the northwest quarter that you have described?
A. I owned the southwest quarter once.
Q. When did you buy that?
A. Shortly after I came there; I don't know whether it was the second or third year after I came there.
Q. Did it have buildings on it?
A. Yes, there was buildings on it but I moved them off.
Q. Whom did you buy that from?
A. From Gust Armstrong.
Q. How did he get it?

A. He took it as a homestead, I think.
Q. And how long did you own it, Mr. Krenz?
A. I must have owned it 6 or 7 years, I guess, or 8.
Q. And then you sold it again, did you?
A. Yes, sir.
Q. But you have known that land well, that southwest quarter of 8, ever since you have been there?
A. Yes, sir.
Q. What has been its condition as to cultivation?
A. As I worked it there was about 75 acres, 60 or 75 acres in field, and the rest I used at that time for hay and pasture.
Q. When you say, 60 or 75 acres in field, what do you mean, cultivated land?
A. Yes.
Q. The rest was in hay and pasture?
A. Yes, sir.
1471 Q. Wild hay and wild pasture?
A. Wild hay.
Q. And who owns it now?
A. I don't know the name of the man, a man in Illinois, I think.
Q. Is there a tenant on it?
A. No.
Q. What is its condition now as to cultivation?
A. They use it for hay.
Q. And this land that was formerly cultivated, is that used for tame hay?
A. No, the party that owned it he wants to rent it for cash and I believe he asked too much and so he don't rent it.
Q. Is that a pretty wet quarter?
A. Well, just the same as the others, if the water- get higher, you know—the Mustinka used to run through there, through that quarter.
Q. How is it in recent years, since the ditch was put in, has it been any dryer?
A. No, sir.
Q. The old Mustinka and the Five Mile creek both ran through that and run together there on that quarter?
A. Yes, sir, on that quarter they join.
Q. And you say there is some water runs in both of them yet?
A. Yes, sir.
Q. Do you own some other land in that locality?
A. I own a quarter in Monson township.
Q. What is that quarter?
A. That is the southwest quarter in Section 1.
Q. And is that the land just west of Mr. Teske's place that has been mentioned here?
A. West of Teske's quarter, yes, sir.
1472 Q. Joins him on the west?
A. Joins him on the west.
Q. How long have you owned that, Mr. Krenz?

A. Between 20 and 25 years, I guess.
Q. Buildings on it?
A. Yes, barn and granary.
Q. What do you do with that land?
A. I was working it, farming.
Q. Do you farm it in connection with your home farm?
A. Yes, sir.
Q. Have you all the time you have owned it?
A. Yes, sir.
Q. What is its condition as to cultivation?
—. There was, the whole farm was under cultivation but the river cuts off on the southwest corner about 5 or 6 acres, something like that, and I seeded that down.
Q. The balance is under cultivation?
A. Yes, sir.
Q. With the exception of that five acres?
A. Yes, sir.
Q. Now, you have lived upon and farmed this land that you have described during the practically 30 years you have been there?
A. Yes, sir.
Q. Each year, Mr. Krenz?
A. Yes, sir.
Q. Gained your liv-lihood from it?
A. Sure I did or else I wouldn't be there.
Q. How large a family have you raised?
A. Seven boys and three girls.
Q. All grown up?
A. Yes; well, one is small, you know, a little over three years old.

1473 Q. Mr. Krenz, when you came there in 1888, were there other settlers in there?

A. Yes, lots of them, the homesteads was all gone.
Q. South and southeast of your place in the town of Redpath and going down into the town of Clifton, particularly the area easterly of the Twelve Mile creek; when you came there what shape was that in?
A. That was settled up just the same as in Redpath or still more.
Q. What was the condition of the lands as to homesteads, as to being taken up?
A. It was taken up, yes. Taken up as homesteads, yes.
Q. All of it?
A. Yes, there was nothing left as I came there; no homesteads left any more.
Q. Did you have occation to become particularly acquainted with the land down east and southeast of you, particularly the land east of the Twelve Mile creek?
A. I had a brother living in Clifton.
Q. What time did he come there?
A. He came there a year before me.
Q. He came then in 1887?
A. Yes, I think so.

Q. And settled in Clifton, did he?
A. Yes, sir.
Q. What section?
A. In 7.
Q. Which part of 7?
A. I believe the east half of 7.
Q. What is his name?
A. Ferdinand Krenz.
Q. Did he build buildings on his land, make his home there?
1474 A. Yes, sir.
Q. Is he living there still?
A. No, he ain't; his boys are on the farm and he is living in town.
Q. What town?
A. Wheaton.
Q. He has moved to Wheaton?
A. Yes, sir.
Q. Does he own a place in Wheaton?
A. Yes, sir.
Q. How old a man is he?
A. He is 15 years older than I.
Q. And how old are you?
A. 59.
Q. And how many years ago did your brother move to Wheaton?
A. It must be either ten or twelve years, I guess.
Q. Did he live on this east half of 7 and raise a family there?
A. Yes, sir.
Q. How large a family?
A. 5 boys and 4 girls, or 5.
Q. All grown up?
A. Yes.
Q. And you say the boys are living on the farm?
A. Two boys.
Q. Did your brother acquire some land around there?
A. Yes, sir.
Q. In what section?
A. He owns five quarters in Clifton.
Q. Which way does his other land lie from the home farm, east half of 7?
1475 A. Southeast and straight east, I believe.
Q. Did you, after you came onto this land in Section 7 of Redpath, go to visit your brother frequently?
A. Yes, sir.
Q. Change works with him?
A. The first years we did but later on we didn't, it was too far to travel back and forth.
Q. But you would visit him and your family visited, I suppose, back and forth?
A. Yes.
Q. As brothers should?

A. Yes, sir.
Q. In going down to his place from your place, how do you go?
A. Straight south, leave the Twelve Mile creek towards the east.
Q. In there around your brother's place in the town of Clifton and extending on northwardly and northeasterly through the of a country is it?
town of Clifton and Redpath east of Twelve Mile creek, what kind
A. A good country.
Q. Always has been?
A. Yes, sir.
Q. Well settled up?
A. Yes, sir.
Q. Good farms?
A. Yes.
Q. Good farm buildings and improvements?
A. Yes.
Q. That country has been described as a swamp, Mr. Krenz; you have known it for at least——
A. I haven't seen any there except the Redpath slough.
1476 Q. Except the Redpath slough?
A. Yes, sir.
Q. And that has been described here as being in Sections 21 and 22 of Redpath?
A. Yes, sir.
Q. How much of an area does that Redpath slough cover, about how much?
A. About two sections and a half or three, something like that.
Q. And has that always been the extent of it there?
A. Yes, sir.
Q. Has it been used. that land?
A. Well, used mostly for hay, hay and pasture.
Q. Each year since you have known it?
A. Yes, sir, the whole section is fenced and then pastured and there is hundreds and hundreds of head in there sometimes.
Q. How about hay?
A. Good hay land.
Q. Put up every year?
A. Well, the most of it.
Q. The most of it each year?
A. Yes.
Q. And how about the quantities of hay raised and put up there?
A. In some places pretty tall, pretty big.
Q. Large quantities?
A. Large quantities, yes.
Q. Was any hay put up there this year?
A. Yes.
Q. What is done with the hay that is put up there from year to year?
A. What they can't use to feed themselves they ship
1477 it, press it and ship it.
Q. Has that been during all of the years that you have been there?

A. Yes, well the early years there wasn't so much hay shipped but they begin that this last 6 or 7 years.

Q. With the exceptions of that two or two and a half sections of the Redpath sloughs, Mr. Krenz, ever since you have known that land in around there, to the south and southeast and to the north, has it been good agricultural land and cultivated farms?

A. Yes.

Q. All the time?

A. Yes.

Q. And has there ever been a time when the land was submerged or covered with water to such an extent that it interfered with cultivation of it?

A. I wish I had the money for the wheat that I hauled through there, cut right straight slanting over to Norcross through the Redpath slough.

Q. You did?

A. Yes, sir.

Q. In the early years?

A. Early years; they make the road nearer a few miles.

Q. Did you have any trouble getting through there?

A. No.

Q. Answer the question a little more definitely; has there ever been a time when those lands, aside from this Redpath slough, were covered with water and flooded to such an extent that they could not be cultivated?

A. Except the Redpath slough? No, I never seen it.

Q. Tell me about the year 1916; what was done with it then?

1478 A. It was farmed but we didn't get very much of a crop, you know, it was too much rain.

Q. And the land wet?

A. Well, it should be wet if it rains a month in one end.

Q. Did it rain a month?

A. Only stopped a few hours towards evening and then in the night we got another rain.

Q. How did that compare with the other years you have been there?

A. Well, that was the worst year I have ever seen since I have been there.

Q. In what respect?

A. That much rain—wet?

Q. Water on the land?

A. Yes, there wasn't blank water only in the gullies, the rest was pudding, soft.

Q. Was there any other year that you had water standing on the land in that way and the land soft as you did in 1916?

A. No.

Q. Never any other year was as bad as that?

A. No, I never seen it so bad and nobody else did. I inquired still from older settlers and they didn't see it.

Mr. Bronson: Objected to as hearsay.

Mr. Palmer:

Q. Mr. Krenz, you remember when this first section of the Mustinka ditch was put in, the first part of it?

A. Yes.

Q. Some 20 or 22 years ago, do you?

A. Yes, either 20 or 22 years. I can't say just what year it was, I forgot that.

1479 Q. What effect did that ditch have on this Redpath slough, whether it drained the water out of it?

A. As far as I seen it, I watched it a good many times, it gets in a little faster.

Q. Gets in a little faster where?

A. Through the Twelve Mile creek faster.

Q. Gets to the Twelve Mile creek faster from the Redpath slough?

A. Yes, sir.

Q. Did it rain away out of the Redpath sloughs so that they were any better for hay lands?

A. No, I don't think so.

Q. You don't think it did?

A. No, for hay land it didn't, it don't matter if the water stays on a few days longer or less, it don't make any difference.

Q. You say the water came a little faster down into Twelve Mile creek through this first section of the ditch?

A. Yes.

Q. Did that flood your lands up in 7 and 8?

A. Well, there was—the Five Mile creek was left open and so they shoot northwest, always have done that.

Q. You mean the old channel of the Five Mile creek was left open so the water shot north and northwest?

A. Yes.

Q. And did that make more water on your land there at times, you think?

A. Well, in the Mustinka, of course, been always full when it breaks up in the spring.

Q. You remember when this second part of the Mustinka state ditch was put in in 1913 and 1914?

A. Yes, sir.

1480 Q. And you know the conditions there since, Mr. Krenz?

A. Yes.

Q. Has that made it any better?

A. Not a bit.

Q. Has this last section of the Mustinka ditch been of any benefit whatever to your land?

A. No.

Q. You haven't noticed any difference whatever since it was put in in regard to the water?

A. No.

Q. You are only about a mile from this point where the new cut-off ditch begins?

A. Yes, it is right straight south of my place a mile.

Q. Have you observed the water in the Twelve Mile creek and in the cut-off, the conditions there since this cut-off was put in?
A. Yes, I did.
Q. Very frequently?
A. Yes.
Q. Tell us about the effect of this new cut-off on the water in the Twelve Mile creek.
A. It was the year 1916, I seen from the second story of my house that the Mustinka raised awful fast and I phoned up——
Q. Raised awful fast where, Mr. Krenz?
A. Raised awful fast on my land.
Q. On your land around the bend?
A. Yes, and I phoned up to a close neighbor, Thomas Hanson, and inquired what the ditch was doing, the new ditch, and he gave me the answer——

Mr. Bronson: We object to that as hearsay.

Mr. Palmer:

Q. Go ahead.
A. He give me the answer that it was idle, lay still, just
1481 the same as in January.

Mr. Bronson: I move to strike out the answer as hearsay.

A. So I wouldn't believe that and I told the boys to hitch up and we would go and look to see it, and there was me and my boy and Mr. Neuman here went over and looked at it and we found it the way that he phoned back to me, it was a dead thing.
Q. A dead thing why?
A. It was froze shut.
Q. Snow and ice?
A. Snow and ice, yes, sir.
Q. How long did it stay that way after you saw it?
A. Well, the water was pretty near gone then I found out it was open.
Q. After the most of the flood water was gone you found that it was open?
A. Yes.

Mr. Bronson:

Q. That was in 1916?
A. 1916, yes, sir.

Mr. Palmer:

Q. At the time that you went down there and looked at it and found it frozen up and dead, as you say, what was the condition of the Twelve Mile creek on around the bend?
A. Well, the water went northwest.
Q. In that channel, you mean?
A. No, in the old channel, in the old Twelve Mile creek.

Q. Was the channel open, the channel of the river, the old river?
A. Yes.
Q. How long had that been open?
A. Oh, it was about two or three days, I guess.
1482 Q. Was it running full, the old channel?
A. Yes, nearly full, yes.
Q. How about it overflowing there at Teske's and further west on your southwest quarter of 1?
A. Well, I never got so far to my own quarter, it was always danger to see if the culvert was torn out; I seen it by Teske on Section 1 and Section 6 right on the section line, I seen the water going over there.
Q. Going what direction?
A. Going northwest, straight north, followed the section line some and then the most of it cuts slanting over to a little lake.
Q. On Teske's farm?
A. Goes into Tintah slough over Teske's quarter.
Q. Had you seen the water go over there before, there on Teske's quarter?
A. Yes.
Q. What years?
A. Year 1915 went over some.
Q. What part of 1915?
A. In March, I guess.
Q. And how about the summer of 1915?
A. I didn't see it in the summer how much goes over there, but I have been told there some going over.
Q. You didn't see it?
A. No, sir.
Q. You did see it going over in the spring of 1915?
A. Yes, sir.
Q. How much?
A. A big quantity.
Q. In the spring of 1916, what would you say as to the quantity of water going over there compared with what you had seen
1483 going over there other years?
A. About again as much.
Q. About twice as much as you have seen going over there before?
A. Yes, sir.
Q. What did it do to the grade and culvert there?
A. It tore out between 6 and 7 rods, I guess.
Q. Tore out 6 or 7 rods of the grade?
A. Of the grade and took the old grade; what was laying there as long as I have been there before the ditch was put in, took the old grade and left the iron culvert post sticking out about a foot and a half.
Q. Left the section post which had been in the old grade?
A. Iron stick.
Q. An iron post which had been in the old grade, left it sticking up a foot and a half?
A. Yes, sir.

Q. Had you ever seen so great a quantity of water going through there any other time you have lived there?

A. No, sir.

Q. And what did it do to the culvert there, Mr. Krenz?

A. Part of the culvert was laying in the pasture about 80 or 90 rods; of course, I didn't measure it, but away out.

Q. 80 or 90 rods from where?

A. From the corner where it was set in the grade.

Q. That was this 24 foot corrugated iron culvert that Mr. Teske has told us about?

A. Yes, sir.

Q. In 1915, as I understand it, there was a county ditch #10 built right along the south line of this Section 6 and Section 1 over to the Mustinka river?

1484 A. Yes, sir.

Q. Which side of the ditch was this road grade built on?

A. On the south.

Q. On the south side and built with the dirt taken out of the ditch?

A. Yes, sir.

Q. That was added right to the grade that was already there?

A. Yes, sir.

Q. This water in going north then, had to go right across the new ditch?

A. Across the big grade, yes, sir.

Q. Across the grade and across the ditch, didn't it?

A. Yes.

Q. And did it cross the ditch and go right on north?

A. To the north, yes, sir.

Q. In the summer of 1916, did you see it going across there?

A. No, I wasn't there then.

Q. In the spring of 1917 did the water go across there at Teske's, this last spring?

A. Yes.

Q. Did you see it?

A. Yes.

Q. When?

A. It was in March, some time in March.

Q. How much?

A. Well, that would have tore out just the same as before if Teske didn't save it by hauling on manure.

Q. It would have torn out just as much of the grade there if Teske had not hauled in manure and saved it?

A. Saved it, yes, sir.

1485 Q. How much water was going over there compared with the season of 1916?

A. It was cutting through some, washed out on both sides of the little bridge they put in later, 4 or 5 feet or 6, on each side of the bridge.

Q. Didn't take out the small new bridge itself?

A. No, the bridge was there.

A. Wooden bridge.
Q. Steel and concrete bridge, isn't it?
A. Wooden bridge, it has steel joists.
Q. Did you see the water going on north along the section line and over to the northwest into this little lake on Teske's?
A. Yes.
Q. In the spring of 1917?
A. Yes, sir.
Q. And compared with the quantity of water you saw there in 1916, was it as much?
A. No, not quite as much.
Q. How long was it running there, do you know?
A. No, I do not.
Q. In 1917, in the spring, when you saw this water going over there at Teske's, do you know what shape this cut-off was in?
A. In 1917? Well, I haven't examined it in 1917.
Q. You didn't examine it last spring to see whether it was working or not?
A. No, sir, I did not.
Q. In the spring of 1915 over on your land, southwest of 1, Monson, did you see water going over there?
A. No, I wasn't there but I can see it on the plowing that it did went over, I came after the flood was over.
1486 Q. How about 1916?
A. The same thing, I never got there when the high water was there. I just came up to Teske's corner, that was all.
Q. But when you did start to work the land, could you see whether the water had gone over or not?
A. Yes, sir.
Q. What had it done?
A. Well, make the plowing level, you know, washed it level, so it must have an awful force across, slow it wouldn't have done that, it wouldn't level that.
Q. And how wide a space had it washed the plowing level?
A. About 6 or 7 rods.
Q. That is 1916, you say?
A. No, I didn't say any year.
Q. 1915 and 1916?
A. Yes, sir.
Q. And how about 1917, this last spring, did it go over there at your place?
A. I haven't seen it.
Q. Did you find that it had gone over?
A. Well, there were some over, but not in such a force.
Q. Do you know about the water in the spring of 1916 taking out the bridge there south of your buildings?
A. Yes, sir.
Q. How much of a bridge was that?
A. I believe 24 or 26 feet, I guess.
Q. Wooden?
A. Wooden bridge and oak piles.

Q. What kind of a bridge was that?

Q. Was that a heavy, substantial bridge?

A. Well, it was strong enough for a wooden bridge, I
1487 guess.

Q. Crossed it with loads?

A. Yes, sir.

Q. That is, I am speaking of the bridge now just south of your barn and granary over on the southwest quarter of section 1 in the township of Monson, you understand that?

A. Yes, sir.

Q. And that is the bridge of which you were speaking?

A. Yes, sir.

Q. What did the water do with that bridge in the spring of 1916?

A. It carried it to the next bridge on the section line going west and left it right against the bridge.

Q. That would be to the south line of Section 2?

A. Yes, sir.

Q. Carried it about how far?

A. About 100 rods, I think.

Q. Have you observed the working of this cut-off, so that you can form an estimate what water the cut-off takes and what part of the water the old channel carries around the bend?

A. I have been there and I expected it would take lots of water.

Q. You expected that what would take lots of water?

A. The new cut-off so I went over there and looked lots of times, and the water what comes down in the old Twelve Mile creek from the south is so much heavier and here comes the old ditch in——

Q. From the east?

A. From the east, and that stream that comes from the south wipes it right along, takes it along in the old channel and goes northwest and made a current that washed out pretty near the iron bridge.

1488 Q. You say the current was so strong that it pretty near washed out the iron bridge?

A. Yes, sir.

Q. The iron bridge where?

A. Right across the Twelve Mile creek.

Q. And which direction from the outlet of the old ditch and the mouth of the new cut-off, which direction?

A. West and east, the bridge is on the north side of the ditch.

Q. Right northwest?

A. Yes, sir.

Q. And that would be a little further down-stream of Twelve Mile creek?

A. No, just where they built the road, taking the dirt out of the ditch and built a road, and there she is about.

Q. Built the road up on the north side of the ditch?

A. Yes, sir.

Q. And there, you say, is a bridge across Twelve Mile creek, east and west?

A. Yes, sir.

Q. That would be immediately north of the mouth of the cut-off?
A. Yes, sir.
Q. And the outlet of the old ditch?
A. Yes, sir.
Q. Now, you say that the current was so strong that it nearly took out that old iron bridge north of the ditch?
A. Yes, sir; she would have went if they didn't save her by rocks and stuff, piled rock in it. They couldn't find no ground hardly, deep poles they put in and they hauled rock and saved the steel piles.
Q. Is that a steel bridge?
A. Yes, sir.
1489 Q. And how about the grade on each side of it?
A. It took the grade, too, washed it away.
Q. How far on each side?
A. About 6 to 8 feet on the west side.
Q. And how high a grade is that?
A. It must be 6 or 7 feet high.
Q. And the width of the road?
A. Yes, sir.
Q. That is about how wide, the grade there?
A. It should be, I never measured it, but I should judge 24 feet wide, I guess.
Q. Now, Mr. Krenz, are there some willow trees just a little further north below the bridge?
A. Yes.
Q. What did the water do to those?
A. What they couldn't pull up they washed right level; they are sticking out like that (indicating).
Q. What washed them level?
A. Water and ice.
Q. And how high were those willow trees?
A. Pretty near up to the ceiling, some higher, some smaller.
Q. 20 feet, something like that, 15 or 20 feet high?
A. Yes, sir.
Q. When did the water do this?
A. In the year 1916 I seen it, that they was all smashed down.
Q. In 1917 was there some washing there?
A. Yes, they went over them again.
Q. Went over these trees again?
A. Yes, sir.
Q. Did it wash the bridge approaches out in 1917?
A. It did too.
1490 Q. As much as it did in 1916?
A. I can't say just how much; they had lots of filling to do.
Q. They had lots of filling to do from the 1917 flow there?
A. Yes, sir.
Q. So what part of the water do you think went on around the bend just the same as it did before the cut-off was put in?
A. The ditch didn't take any in the spring.
Q. In the early spring it doesn't take any?
A. No, sir.

Q. And how is it after it opens up, how much does it take?

A. Well, it takes up a part of the water; it seems to me as if the water don't like the ditch at all. The stream from the south takes that stream that comes from the east and wipes it right along and goes northwest.

Q. Mr. Ralph testified that you told him that the cut-off carried about three-fourths of the water and the old channel around the bend carried about one-fourth.

A. Well, if he said that, that I told him, he turned it around.

Q. Just turned it around, he just turned around what you did say?

A. Yes, sir.

Q. What did you say?

A. I told him I thought I wouldn't be much out of the way if I would say that three-quarters of the water goes north and one-quarter to the lake, to Lake Traverse.

Q. Three-quarters of the water goes north to the Rabbit
1491 river?

A. No, three-quarters to Tintah slough, yes, sir.

Q. And one-quarter to Lake Traverse?

A. Yes, sir.

Q. And that it goes that way now, is that what you mean?

A. Yes, sir; that is, in the spring.

Q. Mr. Krenz, what is your home farm worth there?

Mr. Pinkney: We object to that as incompetent and immaterial, not tending to prove any issues in this case.

A. Oh,—you mean where the buildings are on?

Mr. Palmer:

Q. Well, the buildings and the land that you farm in connection with this farm in 7 and 8.

A. $65 or $75 an acre.

Q. What is your land worth over in Section 1 of Monson?

A. Same.

Q. How does that value compare with the values of other lands generally in Traverse county?

Mr. Pinkney: Same objection.

A. Same thing.

Mr. Palmer:

Q. Has that always been true, ever since you have been there; have your lands there and the lands in your immediate vicinity or neighborhood and the lands to the south and southeast down around your brother's place and particularly in the town of Clifton and Redpath east of the Twelve Mile creek been worth the same all the time as the other lands in Traverse county?

Mr. Pinkney: Same objection.

A. Yes, except the slough in Redpath.

Mr. Palmer:

Q. Except the Redpath slough?
A. Yes, sir.

1492 Cross-examination.

By Mr. Bronson:

Q. Is there any other Carl Krenz living in Traverse county except you?
A. No, I don't think so.
Q. What is your son's name to whom you sold this farm?
A. He lives in North Dakota, that is my son.
Q. What is his name?
A. Carl, he lives in North Dakota, Litchville, North Dakota.
Q. The one to whom you sold this farm?
A. Yes, sir, oldest boy; that is the second boy.
Q. How long has he lived in North Dakota?
A. About four years, and the oldest boy lives right up home in 18.
Q. His name isn't Carl?
A. No, it is Albert.
Q. You are the only Carl Krenz that has lived around there all these years except your son whose name is Carl Krenz?
A. Yes; that is, in Traverse county.
Q. You were talking about the value of these lands, Mr. Krenz, you excepted the lands in the Redpath slough?
A. Except.
Q. Meaning that they were less valuable?
A. Yes, sir.
Q. On account of their being lower?
A. Yes, sir.
Q. And subject to overflow?
A. Yes.
1493 Q. You spoke of this farm you own in Section 18?
A. Yes.
Q. In Redpath?
A. Yes, sir.
Q. That is on the western side of Twelve Mile creek?
A. Yes, sir.
Q. A little bit higher there, isn't it?
A. The land ain't any higher but the banks on the west side is higher.
Q. That is, this land wasn't subject to overflow quite the same as some of your land up in 7 and 8?
A. No.
Q. That has always been the case?
A. There is no creek run through, it ain't got the chance to overflow.
Q. Twelve Mile creek runs through Section 18 but it has well-defined banks?

A. Yes, sir.

Q. You say the market value of your farm, that means land in Section 7, is $65 and $75 an acre?

A. Yes, sir.

Q. And likewise the same in Monson township?

A. Yes, sir.

Q. What was the value of it in 1894, market value?

A. Oh, from $30 to $35, that depends on the improvements what you had on.

Q. Any farm value depends somewhat on the improvements and the buildings that are on?

A. Yes, sir.

Q. You came to this county, as I understand it, in 1888?

A. Yes, sir.

1494 Q. And you have become familiar with the season conditions and the conditions of rainfall and the conditions of flood?

A. Yes, sir.

Q. That existed from time to time?

A. Yes, sir.

Q. You have mentioned about the Mustinka river overflowing at different times when you had wet conditions?

A. Yes, sir.

Q. And you have mentioned also about the Five Mile creek overflowing some?

A. Yes, sir.

Q. In wet conditions?

A. Yes, sir.

Q. You were in this country before any ditches were constructed?

A. Yes.

Q. You came there about the time when the country was new, when it was being settled up?

A. Yes.

Q. And being broken up and farmed?

A. Yes, sir.

Q. And you have seen it develop from those days to the present time?

A. Yes, sir.

Q. You have seen most of these ditches go in that we have talked about?

A. Yes, sir.

Q. Which you heard mentioned by the experts, and so forth?

A. Yes, sir.

Q. You have a ditch on the north end of your farm,

1495 have you not, on the north of it?

A. Both sides.

Q. Ditch to the north, a county ditch, running into the Mustinka river?

A. Running into Twelve Mile creek; well, it runs into the Mustinka river, there is a bridge.

Q. And one on the south side goes into Twelve Mile creek?
A. To Twelve Mile creek, yes, sir.
Q. These are county ditches?
A. Yes, sir.
Q. And they were built for what purpose?
A. To drain off the surface water in heavy rainfalls, I guess.
Q. And were you assessed for these ditches?
A. Yes, sir.
Q. And did they benefit your farm?
A. Well, not that I have seen it yet.
Q. Were you there in the spring of 1897?
A. I have been always there, I wasn't off the place.
Q. Did you have high water there in 1897?
A. We had high water in 1888, the first year I came in the spring.
Q. And now how high was it in 1898?
A. I couldn't say how high, I guess just the same in the springtime.
Q. And in 1888 did you see the water going over into this Tintah slough?
A. Yes, sir.
Q. In those days there wasn't any county ditch to impede or hold back the waters from going north into the Tintah
1496 slough, was there?
A. No, sir.
Q. And you saw the waters going over that spring?
A. Yes, sir.
Q. And were they over the Teske farm in the spring of 1888?
A. Yes, sir, just the same as always; the draws leaves the water through, all the draws run northwest.
Q. In 1897, did you see the high water also going over into the Rabbit river?
A. I wasn't there at the river, the river runs further north, you know. I was only by Section 1 in my home district.
Q. How high was the water on your farm in 1897 on Section 7?
A. I think the Mustinka and the Five Mile creek was level, they leveled the country off.
Q. That is, between the Five Mile creek and the old Mustinka?
A. Yes, sir.
Q. There was quite a stretch of water there?
A. Yes, sir.
Q. And when the water was at its height in 1897, could you look to the north and see the water away up towards the Tintah slough?
A. No, you couldn't tell except you get there on the grade and see the water cutting across, you couldn't look over so far as the Tintah slough.
Q. What effect did this county ditch #10 have on the waters?
A. Well, them ditches there ain't what they should be.
1497 Q. County ditch #10 I am talking about, the ditch north of the Mustinka river, where that bridge was washed out; I am talking about that ditch.

A. The water was coming down, what was in it, if she is open.

Q. Where does it bring some water from?

A. From the east.

Q. In the olden days did the waters in the eastern end of the ditch go northwest?

A. Well—the draws, yes, sir.

Q. And north towards the Rabbit river?

A. Yes, sir; well, they followed all the Tintah sloughs, so far as I could see.

Q. This ditch raised a kind of an embankment along there for several miles, didn't it, this county ditch 10?

A. Well, they built a road from the dirt what they took out.

Q. And they raised the road up a little bit too?

A. Yes.

Q When you have heavy rains in the spring, does the water kind of back up in that ditch to the south or not?

A. No, it don't back up, the water likes the northwest the best where the country slopes pretty well north.

Q. Well, the water can't go across where that ditch is so well as before it was constructed?

A. No, that is right.

Q. So apparently where that ditch is constructed east and west there is a kind of an embankment there which works to hold the water back that formerly went perhaps to the northwest?

A. They cut some ravines and filled it up.

Q. And later that served to bring the water somewhat to the west towards the Teske place?

A. Yes, sir, it is bound to.

1498 Q. Now, you spoke about having high water in 1916?

A. Yes.

Q. And particularly about one month that year when you had a very heavy rainfall?

A. Yes, sir.

Q. What month was that?

A. It must have been, if I am right. It must have been June.

Q. In June, 1916?

A. Yes, sir, I believe so.

Q. What time did you have high waters in the spring of 1916?

A. Well, generally in March, beginning of March.

Q. No, in 1916.

A. Well, it always breaks up in the first part of March.

Q. When was the water the highest in the spring of 1916?

A. Well, I couldn't say just what date.

Q. Would it be on or about April 7th, 1916, or the first week in April, 1916?

A. No, I don't know, generally break up in the first part of March.

Q. You distinctly recollect that the water was pretty high in 1916?

A. Yes, sir, I do.

Q. And when you talk about it being high you refer to the time when it was highest, did you not?

A. No, sir, I don't.

Q. How long did it stay high in 1916?
A. That it floods, you means?
Q. Yes, in the spring of 1916?
1499 A. About a week or ten days.
Q. Then it went down?
A. Yes, sir.
Q. When the water was the highest in 1916 some of it was going there towards Tintah slough?
A. Yes, sir.
Q. By your place in Section 1 and by the Teske farm?
A. Yes.
Q. And some of the water was going around the upper bend of the Mustinka river west from Section 1?
A. Yes, sir.
Q. And some was coming up Twelve Mile Creek?
A. Yes, sir.
Q. And some was coming up Twelve Mile Creek?
A. Yes, sir.
Q. And at that time there was some water on your farm in Section 7?
A. Yes, the Mustinka was level full and running over.
Q. At this time when this water was going over into Rabbit river, the country north was pretty well covered with water, wasn't it, from your farm north of the river up to county ditch #10?
A. Yes, the lower places was plumb full.
Q. And between the Five Mile creek and the Twelve Mile creek there was quite a bunch of water you could see standing on the ground?
A. Yes, sir, on the hay land and pasture.
Q. When the water was at the highest in 1916, when it was going over into the Rabbit river, was the bridge that you have talked about that was carried out covered with water?
A. The water raised her off; it probably got so high that it raised it up and carried it off, the wooden bridge by my farm in Section 1.
1500 Q. Was the water over the banks of the stream at that time?
A. Yes, sir.
Q. Outside of the stream?
A. I wasn't there when the bridge was taken away but I could tell by the land it did go over.
Q. And it covered some of your land?
A. Yes, sir, I say it beat the plowing level, the water; so there must have been a stream going over.
Q. Was Twelve Mile creek out of its banks down to the cut-off ditch at that time on the east side?
A. I don't know if she was, I never was further south as that high water was perhaps in some draws, I don't know.
Q. Do you know where this cut-off ditch crosses Twelve Mile creek?
A. Yes, sir.

Q. And when the flood waters were at the highest in the spring of 1916 were you down there?

A. No, I wasn't, only to examine the new ditch in the section line between the town of Monson and Redpath.

Q. Where would that be?

A. Where the new cut-off cuts across and reaches the old Mustinka again.

Q. Would that be on Section 18?

A. Yes, sir, on the corner of Section 18.

Q. Where the cut-off ditch cuts across Five Mile creek and across Twelve Mile creek?

A. No, that is further west; I mean between Redpath and Monson.

Q. Oh, further west?

A. Yes, sir.

Q. Now, at the time you came down to see that ditch, was
1501 there water standing over the fields and was the water running over into Rabbit river at that time?

A. No, I went over there later.

Q. You went over there later?

A. Yes, sir, after I examined that ditch.

Q. What I want to find out is whether or not at the time you examined this ditch the water was running over into the Tintah slough?

A. Yes, sir.

Q. And the water was high at that time?

A. Yes, sir.

Q. And the upper Mustinka river we call it here and the Five Mile creek were overflowed?

A. Five Mile creek and the Mustinka?

Q. The Five Mile creek as it went into the Mustinka?

A. Yes, sir.

Q. And were there waters coming down from the east working towards the northwest at that time?

A. Coming from the east, yes, sir.

Q. Across the country?

A. Come from east and south.

Q. And were they coming over the lands?

A. They filled up the pasture and hay land where the Mustinka runs through level land and in the gullies, even the gullies where there was low places, they filled it too.

Q. You recognize that, from your long residence there, that the water had to raise somewhat and overflowed the land some before it could go over into the Tintah slough?

A. Yes, sir.

Q. And you recognize also from your observations from the time you have lived there, that before any waters could go over into the Tintah slough the Mustinka river had to overflow and the Five Mile creek had to overflow a little bit?

1502 A. Yes, sir.

Q. And you also recognized, did you not, that whenever waters went over into the Rabbit river, the Mustinka river east of where Twelve Mile creek goes into it and that country south of the

Mustinka river in Section 7 and some along Five Mile creek would be overflooded somewhat before the waters went into Rabbit river?

A. No.

Q. It wasn't necessary to do that?

A. Well, the banks are higher and they kind of go west.

Q. What I want to direct your attention to is this question. Mr. Krenz, that whenever the waters went over into the Tintah slough——

A. I understand that.

Q. — by the Teske farm——

A. Yes, sir.

Q. — whether or not the upper Mustinka river east of Twelve Mile creek was out of its banks or not?

A. Sure it was.

Q. It had to be out of its banks before it went over into Tintah slough?

A. Yes, sir.

Q. And did Five Mile creek also have to be out of its banks before those waters went into the Tintah slough?

A. Yes, sir.

Q. So that in 1916, when those waters were going over into the Tintah slough, the upper Mustinka river east of Twelve Mile creek and the Five Mile creek, a portion of it, was overflowed and the country around there was somewhat covered with water?

A. Covered with water, yes, sir.

1503 Q. And this water had to come down from the country to the east and the country to the south?

A. Yes, sir.

Q. And when it came down there it flooded the land?

A. Some, yes, sir.

Q. And the way it got away in the early days was to either go over to the Rabbit river or go down the bed of the Mustinka river where Twelve Mile creek flows into it?

A. Yes, sir.

Q. I will ask you, Mr. Krenz, at the time when these waters in 1916 were going over into the Tintah slough and at a time when you say, as far as your observation goes, that the amount that was going over there was perhaps twice as much as you ever saw before into the Tintah slough, whether or not you testified or intend to testify that at that time this cut-off ditch from the Twelve Mile creek over west where it joins the Mustinka river was frozen up, full of ice and snow and dead and no water flowing in it?

A. It was dead, exactly.

Q. It was?

A. The flow was pretty near gone then I heard that she open.

Q. You haven't answered my question yet, and I want to ask it again so you will understand it, so you will make no mistake when you make your answer. I will repeat it to you, so you can see whether you understand the question and if you don't, say so. Now, at this time,—I am not talking about when you examined that county ditch, I am not talking about the fact that you did examine it or what you saw when you did examine it, but I am asking you

Mr. Krenz, whether at the time when these waters were going over into the Tintah slough and when they were going over in
1504 that quantity that you say they were going over, whether at that time—not some other time, but at that time—was the time when you examined this ditch, this state ditch, which you say was dead, full of ice and snow and no water flowing into it?

A. I examined the ditch, I seen the water was raising pretty fast on my hay land, so that was the time I examined the ditch and she was froze up.

Q. That was before these waters had started to go into the Rabbit river or was it after?

A. It was before.

Q. You said you were there when the first section of the state ditch was put in?

A. Yes, sir.

Q. And this first section of the state ditch went through the Redpath slough?

A. Yes, sir.

Q. And you mentioned, I believe, that this ditch carried down waters a little faster?

A. Yes, sir, it does.

Q. And more of them?

A. Yes, sir.

Q. And some time in 1897 and 1898 it made a little excess flood didn't it, down by the Redpath sloughs, brought down more waters and faster so that the sloughs there were flooded a little bit more more than they were before?

A. Yes, sir, I think it was. Of course, I wasn't there in the slough so I couldn't tell, but the ditch was running pretty lively.

Q. And it was draining the country east of Norcross?

A. Yes, sir, it comes from Mustinka.

Q. You remember about that Norcross country in the early
1505 days, floods around Norcross?

A. Yes, sir.

Q. How high the water used to get there?

A. Yes, sir.

Q. You remember that this ditch was constructed to drain off some of that territory up there?

A. I believe that was the intention.

Q. It seems, doesn't it, Mr. Krenz, that this old Mustinka river and this Five Mile creek where they come by your farm and go up towards the Teske farm in the spring of the year, the channel below that isn't quite sufficient to carry off all the waters that come because the lands get flooded in the spring of the year?

A. You mean the ditch?

Q. No, the old river.

A. No.

Q. And that condition existed from the time you have lived there every spring you would have more or less flood waters going over your lands, wouldn't you?

A. Yes, sir.

Q. You have, when the waters get a little high every spring, some water going into the Tintah slough?

A. Yes, sir.

Q. This country that we have been talking about where you have your farm is what we call flat, prairie land?

A. Yes, and then there are ravines through it.

Q. And some ravines through it?

A. Yes, sir.

Q. But comparatively speaking, it is flat?

A. Just an average, I should call it, about that.

Q. No hills?

A. No hills in it.

Q. And it is land that needs drainage?

1506 A. Yes.

Q. There isn't any question but what your land needs drainage, is there?

A. Yes.

Q. There isn't any question but that all this land in Redpath township and Clifton township needs drainage?

A. That is true.

Q. And all these ditches have gone in there to drain the lands, haven't they?

A. Yes, sir.

Q. And the state ditch was put in there to drain the land, wasn't it?

A. Yes, sir.

Q. But you say that the state ditch didn't do that?

A. And the other ditches either.

Q. In times of high water?

A. No.

Q. So you need some other kind of ditches or some more ditches?

A. So long as they don't do any good, no use to put in any more.

Q. This cut-off ditch that you have mentioned, the second cut-off ditch, you say that the effect of Twelve Mile creek as it came down from the south was to carry the stream by, in 1916?

A. It does it always.

Q. It does it always, by the cut-off ditch?

A. Yes, sir.

Q. So that this cut-off ditch, which is quite large and quite deep, isn't it?

A. Yes, sir.

Q. Doesn't carry much water; in other words, your observation——

1507 A. It carries water when it is open, sure.

Q. Well, if I understand your testimony correctly, even though the cut-off ditch is open, when the Twelve Mile creek comes down with a lot of water in it, the force of the stream serves to carry it past the cut-off ditch and up north along the Twelve Mile creek and the Mustinka river?

A. The old ditch that is coming from the east runs west into the Twelve Mile creek and the stream from the south in Twelve Mile

creek is so much stronger that it takes it right along and goes northwest in the old channel.

Q. So that the effect of the stream is to carry it past the ditch?

A. Yes, sir, wipes it away.

Q. And does the ditch run full sometimes?

A. No, I never have seen it full. I told already I would wish she would take three or four feet more water, she could but the water don't seem to come into it.

Q. Is there any question but what when there is water 8 foot high in Twelve Mile creek that the water at the place where the ditch joins it is also 8 feet high?

A. I guess so.

Q. So that, whatever the height of the water is in Twelve Mile creek it would be about that in the ditch where it joins it, the state ditch?

A. Yes, sir.

Q. You are not an engineer?

A. No, sir.

Q. You don't pretend to testify what portion the state ditch carries as compared with the Twelve Mile creek or the old Mustinka river, do you?

A. No, sir, I can't do that.

1508 Q. And it serves to carry some water that formerly went around by the old Mustinka river, doesn't it?

A. Yes, sir.

Q. And it is much shorter across there than the old Mustinka was around the bend?

A. Yes, sir.

Q. So that it will carry water faster than the old Mustinka did?

A. Yes, sir.

Q. You have seen this state ditch, which is fairly deep, isn't it, and fairly wide?

A. Yes, sir.

Q. As you observed it, about as big as the Twelve Mile creek?

A. No.

Q. Not as big as the Mustinka river?

A. No, the ditch is deeper but the Mustinka is much wider.

Q. And is that the case where it goes through your farm?

A. The Mustinka?

Q. Yes.

A. Yes, sir.

Q. The Mustinka spreads out a little bit as it goes through your farm?

A. Yes, sir.

Q. Wide and shallow?

A. Yes, sir.

Q. This ditch is much deeper?

A. Yes, sir.

Mr. Palmer: You are talking now about the old Mustinka and not the Twelve Mile creek?

Mr. Bronson: Yes, sir.

1509 Q. In 1916 you said you had a rather poor crop?
A. Yes, sir.
Q. You put your crop in that year?
A. Yes, sir.
Q. How much did you put in that year, 1916, on Section 7, how much wheat?
A. I believe—you mean one quarter or half a section?
Q. I mean the half section in Section 7. You have a half section in Section 7?
A. Yes, sir.
Q. How much did you put in in wheat in Section 7 that year?
A. About 160 acres on that half section.
Q. How much did you put in barley and oats?
A. Well, I couldn't say how many acres I put in of each kind.
Q. Would it be as much as 40 acres of oats and barley?
A. Fully, yes, sir; between 40 and 60 acres oats.
Q. When did you put your wheat in?
A. Well, I couldn't say that either, I didn't put that down.
Q. In the month of April?
A. It was later.
Q. About the usual time in May, first part of May?
A. Yes.
Q. That is spring wheat, isn't it?
A. Yes, sir, spring wheat.
Q. Water had gone off then from the land that spring?
A. It was gone as I seeded, sure.
Q. And the land was dry all right?
A. Not real dry but then you could work it.
1510 Q. And did the crops look pretty good untils the rains came along in July?
A. Fairly good.
Q. Did you get hit with rust that year?
A. Yes, sir, I believe I did.
Q. You harvested your crops that year on that land, got them out?
A. Yes, sir.
Q. But the grain was shriveled up?
A. Yes, sir.
Q. That is what you mean by a poor crop?
A. Yes, sir, it was thinner than we usually have it; it didn't stool so good.
Q. But you cut all your crops, threshed it all?
A. I think so.
Q. And did you do the same thing on Section 1, Monson township, in 1916?
A. No, it wasn't all seeded, I seeded part of it and the rest lay idle because it was so wet I couldn't plow.
Q. You mean in the spring?
A. In the fall I couldn't plow it.
Q. In the fall of 1915?
A. Yes, sir, I couldn't plow.

Q. But you put some in in the spring of 1916 into wheat?
A. Yes, sir.
Q. And harvested that?
A. No, sir, there was nothing to be harvested.
Q. It wasn't worth while harvesting?
A. Well the rainfalls killed it off, it couldn't grow anything only weeds.
Q. In 1916?
A. Yes, sir.
Q. Or 1915?
1511 A. Yes, sir, 1916.
Q. Could you plow in the fall of 1916?
A. Yes, sir.
Q. Put a crop in in the spring of 1917?
A. Yes, sir.
Q. Did you get a crop there in 1914?
A. Yes, sir.
Q. A good crop?
A. Yes, sir.
Q. On all these lands you mentioned?
A. Yes, sir.
Q. And you cut the grain all right, it wasn't too wet that fall?
A. Well, we cut it.
Q. Threshed it?
A. Yes, sir.
Q. Plowed it that fall?
A. Yes, sir.
Q. Land was in good shape for plowing that fall of 1914?
A. We plowed it, yes; I think we plowed it.
Q. All of these years of 1914, 1915, 1916 and 1917, as I understand it, you put in your crops each year?
A. Yes, sir, with the exception of my Monson farm, not all of it.
Q. And you harvested some crops all these years?
A. No, they wasn't harvested in Section 1.
Q. In 1916, but there was in Section 7?
A. In 1917, yes, sir.
Q. Can you recollect at this time just about how much wheat you got in the fall of 1914?
A. No, I do not.
1512 Q. Or what your crop was in the year 1914?
A. I do not. I couldn't state how many hundred bushels or how many thousands, I don't know.
Q. I understand you to say that the month of June—wasn't it June you said, 1916—was it June, 1916, when you said——
A. I believe so it was in June.
Q. Pretty wet?
A. When we had the rainfalls, yes, sir.
Q. It was very wet then?
A. Yes, sir.
Q. And it was pretty wet in June, 1914, wasn't it?

A. I don't know, perhaps it was.
Q. Wasn't it just as wet in June, 1914, as it was in June, 1916?
A. No, I don't believe it.
Q. You wouldn't be positive about that?
A. That was the wettest we ever seen in 1916.
Q. Your principal trouble seems to be from what your testimony discloses that in the early spring the ditches and the rivers and the state ditch do not take care of the flood waters that come down there around your farm in the territory in the spring?
A. They do not.
Q. Now, after the flood exists there a while it does go away?
A. Yes, sir.
Q. And it goes away by the old Mustinka river, around there to the cut-off, it goes away by the state ditch and it goes away some by those various ditches that were put in there, these various county ditches?
A. Yes, sir.
1513 Q. It flows off through these channels?
A. Yes, sir.
Q. This state ditch and these county ditches that have already been put in there, serve to carry off water and to drain the land faster than it would before, isn't that correct?
A. Yes, sir, in rainfalls when the ditches is open they do but not in the spring.
Q. Not when you have all this water in the spring?
A. No.
Q. But the water when it does go off goes off this way and quicker too?
A. Yes, sir, it goes quicker.
Q. And it goes down this Mustinka river down towards Lake Traverse, doesn't it, except that which goes over into the Tintah slough?
A. Yes, sir.
Q. In the olden days before there were any ditches there at all, the water would come from the east and from the south kind of northwest towards this Tintah slough, wouldn't it?
A. Correct.
Q. And would spread over the country to some extent?
A. Yes, sir.
Q. And some would go over into the Rabbit river?
A. Correct.
Q. And some would go down into the Mustinka river?
A. Correct.
Q. And it would stay there some little time until it got away?
A. Yes, sir.
Q. It had to do that?
A. Yes, sir, it did that always.
Q. On those lands we are talking about?
A. Yes, sir.
Q. You have lived there long enough to see the [illegible] ditch put

in going to the east, the second ditch put in making this
1514 cut-off, and then the old Mustinka river from the cut-off down to Lake Traverse deepened and widened and some cut-offs put in, you have seen those things put in?

A. Yes, sir.

Q. And you have seen these county ditches put in this territory running east and west, most of them emptying either into Five Mile creek or Twelve Mile creek or the old Mustinka river or this cut-off ditch?

A. Correct.

Q. Some of that water that in the olden days used to go towards the northwest when there was no ditch there and which used to overflow the land some by reason of that, now goes east and west to the Twelve Mile creek?

A. There is openings in some ditches. In the Five Mile creek I got a bridge there must be 18 or 24 feet wide, I guess, and it goes northwest anyway.

Q. And in Clifton township, for instance, Mr. Krenz, with which you have stated you were familiar, there are several county ditches down in that township?

A. Yes, sir.

Q. And between Five Mile creek and Twelve Mile creek?

A. Yes, sir.

Q. And those ditches, generally speaking, lead into Twelve Mile creek?

A. Correct.

Q. And they carry off some water that formerly would stay on the lands or go northward?

A. Yes, sir.

Q. Likewise up in Redpath township you have a bunch of ditches there, several of them, practically one on every section line which take the water over into Five Mile creek and some into Twelve Mile creek and some even into the old Mustinka?

1515 A. Yes, sir.

Q. The effect of those is, general- speaking, is it not, to take some water which formerly used to go in early days northward towards this Tintah slough and northwesterly, to take them east into the Twelve Mile creek through the ditch because the ditch runs east and west?

A. Yes, sir, they would go further up there, there is ravines and draws you know, they follow all into the Tintah slough.

Q. And the effect of these ditches, putting them in each mile, would take some of the water that would go northward and take it down to the Twelve Mile creek.

A. Yes, sir, where they have no culverts or bridges in, have to take it straight west.

(At this time recess is taken until 1:45 o'clock p. m., October 5, 1917.)

October 5, 1917, 2 p. m.

Pursuant to adjournment hearing resumed with all parties present.

CARL KRENZ, recalled and cross-examination continued.

By Mr. Bronson:

Q. Mr. Krenz, did you come down to the legislature in the year 1909 or 1910?
A. I believe I did.
Q. With some other farmers?
A. Yes sir.
Q. And you signed a petition to the legislature with some 1516 other farmers?
A. Yes, sir.
Q. Concerning these ditch proceedings, the Mustinka state ditch?
A. The new ditch, you mean?
Q. Yes?
A. I think I did, for relief.
Q. And you remember appearing before the committee of the legislature and being asked some questions?
A. Yes, sir.
Q. Testifying?
A. Yes.
Q. And you told them what you knew about the conditions up there at that time?
A. Ditches?
Q. Yes.
A. There were no ditches there.
Q. Did you tell them about conditions up there in that country?
A. Yes, sir.
Q. Concerning which you wanted relief?
A. Yes.
Q. And you told them the truth that time?
A. Yes.
Q. And you knew as much about conditions up to the time you came down at that time as you do now?
A. I know really more now.

(Question repeated.)

A. Yes, sir.
Q. Was the flood in the summer of 1916 on this land as high as it was in the spring of 1916?
A. About the same, I guess.
Q. And when did you have the flood in 1915?
A. I don't remember.
1517 Q. In the summer or in the early spring?
A. Oh, in the spring we generally always get it.

Q. Did you say that the flood in 1915 was in the early spring, or was it towards summer or later spring?

A. Well, I don't remember. I couldn't say what day in the month or what month even.

Redirect examination.

By Mr. Palmer:

Q. Do I understanl you to say, Mr. Krenz, that some of your land in the east half of Section 7 of Redpath township was at times wet from the overflow of Five Mile creek and the old Mustinka river?

A. Well, not all over. It was in the coulees, and where the Mustinka ran through it flowed over in a wide strip, and some of the land what joined close to the Mustinka was wet.

Q. Is it that same way now in the spring?

A. Yes.

Q. Has this ditch construction helped it any?

A. Well, I stated that there was no—all them ditches are no good in the overflow; the state ditches and the county ditches didn't help us any.

Q. And with reference to the quantity of water coming from the northwest into the Tintah slough, would you say that that is the same now as it was before these ditches were put in?

A. It seems so.

Q. Well, is that your opinion about it from what you have seen and observed there?

A. Yes, sir.

1518 Q. Of these flood waters that come up from the east and the south going northwest, do I understand you to say that you think there is as much as three-fourths of it goes northwest into the Tintah slough and about one-fourth goes down to Traverse Lake?

Mr. Pinkney: Objected to as having been already gone over by counsel.

A. I should judge that way. Of course I haven't weighed it and I haven't measured it either.

Q. Now when you testified before the legislature you thought that the construction of a cut-off, the same as was put in, and the deepening of the Mustinka below would relieve those conditions of flood in the spring periods of freshets there across your land and going over into the Tintah slough?

Mr. Pinkney: Objected to as incompetent and immaterial, not the best evidence. He should tell what he said, not what he thought.

A. Yes.

Mr. Pinkney: Move to strike out the answer for the reasons stated above.

Q. Did it have the effect that you expected it to have?

Mr. Pinkney: Same objection.

A. No, sir.

Q. And was it a failure as far as relieving those conditions was concerned?

A. That is in the springtime, yes.

1519 Recross-examination.

By Mr. Bronson:

Q. You state in the springtime?

A. Yes, sir.

Q. What other times did it relieve the conditions?

A. Well, when she is open she takes her share of the water, of course.

Q. That is the ditch does?

A. The state ditch, the cut-off, yes.

Q. And it did that in the summer of 1916?

A. When she is open, sure.

Q. Now you don't mean to testify, do you, Mr. Krenz, in this case that all these ditches that we have talked about here did not serve to be of any benefit in the year 1916 to carry off the water?

A. That is not in the spring. They are no good when they are full of snow and ice.

Q. What would you say about the summer of 1916?

A. When they are open in the summer they are there.

Q. And they take off the water rapidly don't they, more rapidly?

A. Yes, sir, quicker.

Q. And just as soon as they are open they serve to do that in the spring too?

A. If they are open, yes, sir.

Q. In other words, if you have a given quantity of water on this land that we have called the delta zone with these ditches, the state's ditch, the first and second ditch, and all of these ditches that lead into it, the water will go off more rapidly and faster than it would without the ditches there?

A. Yes, sir.

Q. No questions about that?

1520 A. Yes, it will if they are open.

Q. When the farmers came down here in 1909 or 1910—I don't know the exact year—and you came along with them you wanted to get some relief for this district on account of flood waters, did you not?

A. That is right.

Q. And you wanted to get the state of Minnesota to assist the farmers up there in getting rid of these flood waters on account of damage done a few years before that to your farms?

A. Yes, sir.

Q. For several years after this first ditch was constructed?

A. Yes, sir.

DAVID J. NEUMANN, having been called as a witness on behalf of the defendant, was duly sworn and testified as follows:

Direct examination.

By Mr. Palmer:

Q. Where do you live, Mr. Nuemann?
A. In Redpath township, Traverse county, Minnesota.
Q. How long have you lived there?
A. Since 1886.
Q. How old a man are you?
A. I was born in 1871. I guess about forty-six.
Q. What is your occupation?
A. Farming.
Q. And has that been your occupation all your life?
A. Yes, sir.
1521 Q. And where in Redpath township do you live?
A. In Section 7.
Q. What portion of the section?
A. There is a fraction in there and we live on the fraction. That is on the west side, on the west line of Section 7, near the township line of Monson.
Q. This fraction of land on which you live would correspond to what quarter of the section?
A. It is on the northwest quarter of section 7.
Q. How much land do you own there?
A. About 367 acres.
Q. How long have you lived on that farm?
A. Since 1886.
Q. You have lived then continuously on this same place since 1886?
A. Yes, sir.
Q. You were about fifteen years old when you came there?
A. I think that was it—fifteen.
Q. You came there with your parents, I suppose?
A. Yes, sir.
Q. And they settled there upon this land?
A. Yes, sir.
Q. And are they living?
A. They are not living, no.
Q. And when they retired from the farm you took the home place and continued to carry it on and operate it and have ever since?
A. Yes, sir.
Q. And are operating it at the present time?
A. Yes, sir.
Q. So you have lived and farmed upon this land continu-
1522 ously, as I understand it, since the year 1886?
A. Yes, sir.
Q. When you came there what was the condition of the country around there as to settlement?

A. If I remember right it was settled up as much then or more than it is now. All settled up. There was no homestead or anything to get any more at that time.

Q. Did your father take this land as a homestead?

A. No.

Q. He brought it from a homesteader?

A. He bought it.

Q. Can you describe your land, Mr. Neumann?

A. It goes in lots. Lots 1, 6, 7, 8, 9, 10, 11 and 12.

Q. Of Section 7, Redpath Township?

A. Yes, sir.

Q. Did you soon after you moved to this locality become familiar with the lands to the east and southeast of your place down toward Norcross and Herman, particularly the lands easterly of Twelve Mile creek?

A. Yes, sir, partly.

Q. What was the condition of those lands as to settlement?

A. Why, that was all settled, that is with the exception of the Redpath sloughs in there—several sections there.

Q. What sections were those?

A. Why there was 21 and 22—I couldn't describe exactly, but right in there—21 and 22, right around in there.

Q. About how much of an area all told?

A. Oh, some two or three sections.

Q. Now with the exception of those two or three sections in the Redpath sloughs you say it was all settled up?

1523 A. Yes, practically.

Q. Buildings on the land?

A. Yes, sir.

Q. Homesteaders occupying and cultivating them?

A. Yes, sir.

Q. And did that condition continue continuously up to 1896, we will say, and from that time on to the present?

A. About, yes.

Q. How do you remember particularly that the country was as well settled up, we will say, in 1896, as at the present time?

A. Well, I took it from the vote in the general election. I know in Redpath township in 1896 we had more votes then registered as any other time that I know of in the township.

Q. How did you come to notice that particularly?

A. Why, I was on the Board at that time, judge of election, and I have been later and we have been speaking about that many times.

Q. Do you hold some official position in the township now?

A. I do.

Q. What is that?

A. Supervisor.

Q. For how long a period have you been supervisor of the town?

A. I think now it has been ten years, that is, right along in succession.

Q. This last time?

A. Yes, sir.
Q. And I presume off and on prior to that time?
A. Yes, there was two years prior to that.
Q. How much of a family did your parents have?
1524 A. There was eleven children.
Q. What are the character of the improvements on your home farm there?
A. Well, fairly good improvements.
Q. Above the ordinary, Mr. Neumann, would you say?
A. Why, I wouldn't try to say that unless I had to.
Q. But have the improvements always been good substantial improvements?
A. Yes, as time went on of course we had to make new improvements.
Q. Now about the state of cultivation of this land, we will say at the present time?
A. Well, our land is all under cultivation, except what we use for pasture, and that has been cultivated and seeded into tame grass.
Q. How long has it been all under cultivation?
A. Why, I just couldn't tell you, but it was a few years after we came here that we broke the last of the prairie.
Q. And has it been all continuously cultivated ever since?
A. Yes, sir.
Q. I take it, Mr. Neumann, that you have kept well informed on the development of the country there and the rise in farm values and matters of that kind?
A. To some extent.
Q. What would you say as to the value of your lands or these lands on which you live, and the lands to the east and the south, and particularly easterly of Twelve Mile creek in Redpath and Clifton townships as compared to the value of other farming lands in Traverse county and the surrounding counties?
A. Well, I would think that the value is just as much for my land as the others, only when you get closer to market it seems that land will be more in value because you are closer to market.
1525 Q. But aside from that element would you say that the lands that I have mentioned have kept pace in the rise in values with the other farm lands in Traverse county?
A. Yes, sir.
Q. Has there been any time, Mr. Neumann, when those lands were of less value than other agricultural lands in Traverse county on account of any more wet conditions there?
A. I don't think they have.
Q. I will ask you to kindly look at this map, Defendant's Exhibit No. 4. Are your buildings correctly located at the point marked "Neumann" and by two black dots on this map, just below the influx of the old Mustinka river with Twelve creek on Section 7?
A. I think the buildings and the river should go a trifle more this way. I haven't measured it but I think it would be a little bit south where the buildings should be.
Q. But this is substantially correct?

A. Yes, sir.

Q. Now, I want to ask you about the early conditions before any ditches were put in anywhere in this locality, the comparative size of Twelve Mile creek as it goes right past your house there and the old Mustinka river as that goes right there by your buildings, just north of your buildings?

A. You mean the size of the river bed.

Q. Yes, and the amount of water and so on, the size of the stream?

A. Why, years ago the water would generally come down to the Mustinka first, and some years now it has come down Twelve Mile creek first, but this spring it came down the Mustinka about four days before it came the other way, before it came from Twelve Mile creek.

1526 Q. Now you have told me which became operative first in the spring, but what about the size of them and the amount of water that they carried; which has been the larger stream in the old times before the ditching?

A. The Mustinka was to start with.

Q. The Mustinka was the larger stream to start with?

A. Yes, sir.

Q. And about the velocity of the current, and the volume of water carried?

A. Why I could not just tell you. It would spread out there quicker because it didn't have the banks to hold it.

Q. That is before its confluence with Twelve Mile creek it would spread out?

A. Yes, sir.

Q. Now when both of the streams were running full, we will say, which was the biggest, Mr. Neumann, in the old times?

A. Twelve Mile creek.

Q. Which had the larger channel and the higher banks in the old times?

A. Twelve Mile creek.

Q. Could you say how much larger it was in its channel and width of stream—what I mean by that is was it twice as large, or half again as large or three times as large, or what?

A. Well, the river bed in itself is about again as large as the Mustinka, again as wide.

Q. About twice as wide?

A. Yes, sir.

Q. And the depth?

A. Why it is somewhat deeper. That is the banks are

1527 higher.

Q. So that when they were both full what volume of water would be carried by Twelve Mile creek as compared with the old Mustinka?

A. Well, I don't know whether I could say. I don't know.

Q. Would you say twice as much?

Mr. Pinkney: Objected to as leading and suggestive.

Q. I simply mean, I want you to express it that way?

A. It is possible that there is more water comes down in Twelve Mile creek.

Q. What I would like to get an expression on, Mr. Neumann, from you is this, whether Twelve Mile creek or the Mustinka in the old times before any ditching, was the larger stream carrying the most water?

A. If it was high so it went out of the banks the Mustinka would bring the most amount of water.

Q. Now can you go on and tell us how it was if the water stayed within the banks?

A. Then Twelve Mile creek would bring more.

Q. Now since the construction of these ditches, by which I mean the two sections of the Mustinka ditch, the Mustinka state ditch, which has brought the most water?

A. The first section.

Q. After the construction of the first section of the Mustinka state ditch, which of the streams brought the most water, Twelve Mile creek or the old Mustinka?

A. Some years it didn't come down as I say in Twelve Mile creek to start with. When the first state ditch started the ditch couldn't take it and the ditch was filled up and it went on the side of it and spread out and came down there and the Mustinka would catch it and it would come down the Mustinka river.

1528 Q. And it would bring it there the same as it did before the ditch was constructed?

A. Yes, sir.

Q. And after the ditch had been opened up and became operative, what then?

A. Why then it would come down Twelve Mile creek.

Q. Now this Five Mile creek, I believe that comes into the old Mustinka here in the Southwest quarter of Section 8 at Redpath?

A. Yes sir.

Q. Now how large a stream was that in the old times compared with the old Mustinka?

A. Why, it wasn't so much. There wasn't as much water came down there as there was in the Mustinka.

Q. How about its overflow?

A. Why, it would overflow the same as the Mustinka. It seems it would back up in there. You couldn't tell so much about it unless you was right there to see it because it would back up and you wouldn't notice it, when the Mustinka would start to overflow, get larger. It would keep backing up gradually.

Q. And overflow some land along its course?

A. Yes sir.

Q. Now after the construction of that first section of the state ditch which, I believe, was in 1896?

A. About there.

Q. Did you observe any difference in the operation of this Five Mile creek?

A. I don't know as I did. I couldn't tell to that.

Q. Did the land overflow along the banks some in Sections 17 and 8 of Redpath?

A. I have seen it there some.

1529 Q. After that ditch was constructed?

A. Yes sir.

Q. In flood times and before the construction of any ditches what was the condition there at your farm as to the overflow of the old Mustinka?

A. It would overflow the same as they had done after the ditching.

Q. Which part of the ditching do you mean?

A. State ditch.

Q. The whole state ditch you mean?

A. Yes sir.

Q. That is at times the overflow from the Mustinka flooded your land somewhat?

A. Yes sir.

Q. And was your land troubled with overflow from Twelve Mile creek as it passes through near your buildings?

A. Why, no.

Q. Was it after the construction of this first section of the state ditch troubled with overflow from Twelve Mile creek?

A. Well, I can't say that exactly whether it is from Twelve Mile creek or from the Mustinka. They come together and if the water gets high it will come over and I don't know which one it is that does it.

Q. The point I wanted to direct your particular attention to was whether this first section of the state ditch caused any more overflow of the Twelve Mile creek there at your place than there was there before?

A. I don't think it did.

Q. Now, in those times of overflow where did the flood waters go? What direction did they take?

A. They went to the northwest.

1530 Q. Now I am speaking of the time before the construction of the ditches?

A. Northwest.

Q. And what general course from your place there?

A. Well, some of it followed the river, the Mustinka, and some of it went across country.

Q. Now when you say followed the river, the Mustinka, you mean Twelve Mile creek after the influx of the old Mustinka into it over there at your place, do you?

A. Yes, sir.

Q. As I understand it, you spoke first of the Mustinka river as this old Mustinka river going through the southwest quarter of 8, and on up through the north of Section 7 and over into Twelve Mile creek there by your buildings?

A. Yes.

Q. And that is after it has been joined by Five Mile creek there in the southwest quarter of Section 8?

A. Yes, sir.

Q. And you call it the Mustinka river up to the point where it joins Twelve Mile creek?

A. Yes.

Q. And then Twelve Mile creek comes up from the southeast and right there by your buildings, north of your buildings, the old Mustinka joins it?

A. Yes.

Q. Then from that point on you call all three of them the Mustinka river?

A. Yes, sir.

Q. And so on clear down to Lake Traverse?

A. Yes, sir.

Q. And when the overflow waters went northwesterly from your place where did they go?

A. Well, they went part of them in the river and part
1531 of them went overland.

Q. To what place?

A. Well, they went into what we call the Tintah slough.

Q. And those that followed the river, did they follow the river clear on around the bend or overflow?

A. They overflowed.

Q. Where?

A. Well, in Section 1 in Monson, and some farther down.

Q. Now in what part of Section 1 did they overflow?

A. Near the township line, near the southeast corner of One.

Q. That is at the Teske place?

A. Yes, sir.

Q. The southeast corner of Section 1 is just southeast of Teske's place?

A. Just a little bit west of the corner of Section 1.

Q. Is where it overflowed?

A. Yes, sir.

Q. Now where would those overflow waters go?

A. Go north and northwest.

Q. Into what?

A. Into the Tintah slough.

Q. And from there?

A. Well they go to the Rabbit river.

Q. Now speaking of this point of overflow there by the southeast corner of Section 1, just east of the Teske place, what are the first years that you remember of any considerable quantity of water overflowing at that point over into the Tintah slough?

A. You mean the amount?

1532 Q. Any considerable amount—the years when you first remember any considerable amount of overflow?

A. In 1888. The Town Board told us to take the bridge up on the town line right west of us across the Mustinka—if the water should come high we should take that up to save the bridge. There was a bridge there made of plank and lumber, and the water came one morning before breakfast. We noticed it and we had breakfast

and went over, my two brothers and myself and was going to take it away, and we didn't get it all gone until the ice and water came and took the balance of it. Then we had to walk down over into just about south of the southwest quarter of Section 1. We had to cross the river there and come up on the north side of the river to get up home. And then there was water running across the road at the Southeast corner of Section 1 going north.

Q. How wide a current do you think?

A. Well, it wasn't so very wide then yet—then several rods.

Q. Did it get wider afterwards?

A. I expect so because the water raised and we didn't have any boat to go down there.

Q. Was there considerable current to the north of there?

A. There was.

Q. How long did that condition continue, that overflow there?

A. I couldn't say.

Q. Now were there any other points at which the water overflowed that year that you noticed over into the Rabbit river?

A. No, we had no boat and we couldn't go out so we couldn't see.

1533 Q. Now that was in the spring of 1888?

A. Yes, sir.

Q. Was that the time of the spring break-up?

A. Yes, sir.

Q. Now what was the next year that you remember of the water going north into the Rabbit river?

A. Oh, there was—I couldn't tell exactly. There was some years we didn't have a boat and couldn't see and the neighbors there said it was about the same one year after another when the water was high, so I couldn't say myself because some years we didn't have a boat and I couldn't go down to see it.

Q. Was there some one living on this place, that is now occupied by Mr. Teske, at that time?

A. Yes, sir.

Q. Buildings there?

A. Yes, sir.

Q. Were their buildings damaged any by the overflow?

A. I don't think they were.

Q. You don't think it came up to the buildings?

A. No.

Q. Did they continue to occupy the buildings and cultivate the land there?

A. Yes, sir.

Q. Each year?

A. Yes, sir.

Q. What was the name of these people?

A. Holmstron.

Q. Did they live there until Mr. Teske bought the place?

A. There was a couple years after Mr. Thompson died that the

widow lived there, and then she rented it out to a party by
1534 the name of Bergeson for several years.

Q. But it always has been occupied and cultivated?

A. Yes sir.

Q. Now can you remember any other year after 1888 when you yourself observed the flow of the waters to the north there at the Teske place?

A. In 1897.

Q. Now tell us what you recollect about that, Mr. Nuemann?

A. Why, it was up quite high then, and there was enormous quantity of water running there, about like I would judge it was in 1888.

Q. Was that at the time of the spring break-up also?

A. Yes.

Q. What was the condition that winter of 1896 and 1897 as to snow?

A. There was quite a lot of snow.

Q. And in 1897 did you observe it running over at any other point than there at the Teske place?

A. No, I haven't been down there farther at that high stage of water.

Q. Now did I understand you to say that you thought there was as great a volume of water that went over into the Rabbit river in the spring of 1897 as there was in 1888, as far as you observed it?

A. I think it was the same.

Q. Now do you recall any other year after 1897 when you personally observed the overflow of the water there into the Rabbit river?

A. Well there was in 1916 and 1917.

Q. Do you recall 1915?

1535 A. Well, I wouldn't say. I think it ran over, but I don't think I was down there and seen it.

Q. The summer of 1915 were you down there?

A. Yes, I was there.

Q. Did you observe the water running over there?

A. Well there was some going there when I seen it, but not so very much in 1915 when I seen it.

Q. That was about what time in the summer of 1915?

A. Well, I couldn't say just exactly. It was, I think in June or July.

Q. When you say "going over there" you mean into the Tintah slough?

A. Well, going north. I didn't follow it up but it was nothing in a northerly direction.

Q. As you had seen it before?

A. Yes sir.

Q. You say there was not very much running when you were there in July of June, 1915? Were there evidences that there had been more going over there than you saw?

A. Well, the roadbed was washed out quite a bit there so I judged there was. It was going quite a lot anyhow.

Q. Now that was the roadbed where?
A. Right near the corner of section 1. The road runs east and west and it runs across the road.
Q. That road running east and west on the south line of Sections 1 and 6?
A. Yes sir.
Q. Was there a culvert in there?
A. Yes sir.
Q. In the summer of 1915?
A. Yes sir.
Q. Was it going through this culvert?
1536 A. Yes.
Q. And it washed out the grade besides?
A. Yes sir.
Q. You couldn't say for how long a period it went over there in 1915?
A. No, I wouldn't.
Q. Mr. Neumann, when was this ditch dug, County ditch No. 10, along the south line of Sections 1 and 6?
A. 1915.
Q. Do you remember what part of the year?
A. Yes sir.
Q. What was it?
A. That must have started about in August.
Q. Where did they start?
A. At the river on that line there.
Q. And dug east?
A. Yes sir.
Q. And did they complete the ditch that fall in 1915?
A. Yes sir.
Q. Now do you remember how large a ditch that is?
A. It was supposed to be five foot bottom, but it wasn't quite five feet—about a four and a half foot bottom and about ten feet deep. And it varied in depth so I couldn't tell that—about five or six feet there.
Q. You mean there at the southeast corner of Section 1?
A. Well, no, there it was only two or three feet deep or so.
Q. And it got deeper as they proceeded easterly?
A. Well, for a ways.
Q. Now you say it was only two feet deep along the southeast corner of Section 1?
A. Well probably three feet deep there.
1537 Q. From the river back to that point?
A. No, by the river it is higher. The ditch was deeper there from the river until the corner, and there is some draw there and there they didn't dig quite so much right at the corner.
Q. You say they dug it about three feet deep there past the corner?
A. Possibly, I haven't measured it.
Q. Now what was done with the dirt?
A. It was put on that roadbed.

Q. Which side of the ditch?
A. North side.
Q. And leveled off?
A. Yes sir.
Q. Was there a grade there before that?
A. Yes, sir.
Q. How much did this excavated material raise the roadbed. I am speaking of right along past that corner?
A. Why, I would judge something about three feet or so, or three and a half.
Q. And how high was it in the first place?
A. Why, it was pretty near level with the rest of the road. They had filled in there extra before; some extra filling in there when they put the culvert in.
Q. How much of grade was there above the level of the surrounding land after the ditch dirt was put on and leveled off?
A. You mean on that place near the corner?
Q. Yes.
A. It must have been about five feet.
Q. Now that was at this depression that goes across the corner there?
A. Yes sir.
1538 Q. And outside of that depression on either side about how high was the grade?
A. Oh, something like three feet or a little bit over.
Q. Is there a north and south road at that point also on the section line?
A. Yes sir.
Q. Now was there a bridge put across this ditch in 1915 on the north and south road?
A. There was a temporary bridge.
Q. Has there been a more permanent bridge put in?
A. Yes sir.
Q. How much of a span?
A. I think it is either 12 or 14 feet span.
Q. And what sort of bridge?
A. Well they are wood posts and steel girders and plank floor.
Q. The east and west road immediately north of this ditch was there a provision made for bridging that, the channel through there?
A. In the first place when they made the ditch they put in a culvert.
Q. That is the culvert that has been testified to here by Mr. Teske?
A. Yes sir.
Q. Twenty-four inch corrugated iron culvert?
A. Yes sir.
Q. Had there previously been a culvert across the road grade there?
A. Yes sir.
Q. What kind of a culvert?
A. Well, at one time I guess they had a plank culvert in
1539 there and another time they used tile culverts.

Q. How large?

A. The one that was made of plank I think was only a four plank culvert, and the tile culvert must have been eighteen or twenty inch culvert. I wouldn't say exactly.

Q. Now when you say the summer flood of 1915 washed out the grade at that point, did it carry out this culvert also, this title culvert?

A. Why, I don't think it did. It washed most of the dirt away but the tile culvert stayed there.

Q. Washed the dirt away from each side of it?

A. Over that whole bottom there. The grade had sunk a little and it was a little bit over the other part of the road and so it went over that depression or ravine. It was probably a rod or two wide and it ran over the full length of it.

Q. Then the spring of 1916 found this ditch there immediately south of the road along the south line of section 1, the grade on the east road raised up by adding this excavated material from the ditch and leveled off, and the twenty-four inch corrugated culvert, which Mr. Teske had put in there?

A. Yes sir.

Q. Now were you up there and observed the conditions in the spring of 1916 at the time of the break-up?

A. I was there once.

Q. About when was that?

A. That was about, I would judge, when the water was pretty near at its heighth.

Q. Describe the conditions as you saw them at that time?

A. I will not say that. It was after the water had gone down a little bit that I was there. And when I seen it it had tore
1540 out the bank or the roadbed there and the water was going in great quantities then yet.

Q. Where?

A. It went north.

Q. And you say it had torn out this grade?

A. Yes sir.

Q. How wide a space?

A. Well, I don't know then exactly the condition it was in until after the water went away and then I could see about what it had done. And then after the water had gone it was washed out. It had washed away the grade and the old filling and part of the natural dirt that was in the bottom of that -rain. It took out a lot of the old natural dirt, in places about two feet deep below the old grade or the ditch grade that was put on.

Q. Scoured out about two feet of the original earth there?

A. Yes sir, and it had taken the grade away somewheres about six rods in length.

Q. And the culvert?

A. Why, that went way out in the field north. It took it through the barbed wire, and there was this hog pasture fence—it took it through that or over it. I don't know how it got it, but it was over the mesh fence and in his pasture about sixty or seventy rods north.

And right at the corner there is a telephone post and that was washed out so it was leaning over pretty near falling down.

Q. How large a pole?

A. I think it was a twenty-four foot pole—I think that is what they put in for the corner post, and about eight or ten inches at the bottom. The bottom of the post was eight or ten inches
1541 thick.

Q. How deep in the ground was it set?

A. I think they put them in about 5 feet.

Q. Had that been set in the grade or in the ground?

A. In the ground.

Q. Now you say you didn't see the point there until the waters had gone down somewhat from the highest peak of the flood?

A. Yes sir.

Q. Do you know about how many days the waters went over there in the spring of 1916?

A. Oh, they must have went about a week or ten days.

Q. And in what velocity of current do you think, Mr. Neumann?

A. Why, it went fast.

Q. Now what quantity of water went over there comparing it with what you have seen in the flood of 1888?

A. Well, I couldn't tell that only from the appearance of the ground. From the washing it must have went quite a bit more now than it did then. That is it washed it more.

Q. There seemed to be evidences there of a greater flow of water to the north than you had seen in 1888 or 1897?

A. Yes, it seemed so to me.

Q. And did you observe any other points at which this overflow was going to the north in the spring of 1916?

A. No, I wasn't down farther so I couldn't say. I didn't see it myself.

Q. Now was there an overflow there at your place and around your buildings in the spring of 1916?

A. Yes sir.

Q. Tell us about that, Mr. Neumann?

A. Well, the water that overflowed came partly from Twelve Mile creek and went north and then it went over into the Mus-
1542 tinka and from there on it went north across the field.

Q. In what quantities?

A. Why, in great quantities.

Q. How as compared with former years that you had had an overflow there?

A. Well we have only had it—that I noted it overflowed Twelve Mile creek three times since we are there in that particular point.

Q. And what times are those?

A. That was in 1916, in 1897 and in 1888.

Q. Now was there as great a quantity of flooding there at your place in the spring of 1916, as there was in 1897 and 1888?

A. I think it was about the same.

Q. And those overflow waters, did they go back into the Mus-

tinka river again, that is farther down stream, or did they go on to the north?

A. Well, a good deal went to the north, and I suppose a good deal went along down the Mustinka.

Q. Can you tell us anything about the washing away of this bridge over on the south line of the southeast quarter of Section 1?

A. Not any more than it had taken it down there and set it, or it stopped near the bridge on that same line farther west.

Q. About as Mr. Krenz described it?

A. Yes. It would have went farther if there had been no bridge there, I guess. The bridge stopped it there.

Q. That is the bridge on the road on the south line of the southeast quarter of Section 2?

A. Yes.

Q. The summer of 1916 did you observe whether the
1543 waters overflowed into the Tintah slough at this southeast corner of Section 1?

A. Yes, they went northerly.

Q. The same course as they took in the spring of 1916?

A. Yes sir.

Q. Were you there so you observed them going north, Mr. Neumann?

A. Well, I have been going there, and we went to church going west, but I haven't been up north farther so I couldn't say just where they went to, but from the point there they went northerly.

Q. And that was about what time in the summer of 1916?

A. I think it was in June, the latter part of June.

Q. What quantities?

A. Well, there was quite a bit of water going there, quite a stream, covered quite a bit of land there.

Q. It was as much as in the spring of 1916?

A. No, I don't think so.

Q. But quite a current you say going north?

A. Yes sir.

Q. Do you know how long a time they flowed there in the summer of 1916?

A. No, I couldn't say now.

Q. What was done to reinstate the grade on the east and west road there at the southeast corner of Section one and to bridge the channel going north there?

A. They filled it up in the fall of 1916 and put in a bridge there.

Q. What kind of a bridge?

A. There was wooden posts and they had a steel rail for sills.

Q. How large a span?

1544 A. I think it was eight foot, and about a sixteen or eighteen foot driveway.

Q. Now can you tell us about the conditions there this last spring, in 1917?

A. Well, I can't tell you more than the conditions what it looked like after it had happened because I wasn't there when the high

water was. The grade was washed out on both sides of the bridge. I think one side was washed off between five and six feet and the other a little less, probably three or four feet.

Q. On each side of the bridge?

A. Yes sir.

Q. How deep down?

A. Deeper than it was before.

Q. More of the original ground?

A. It seemed to me, yes.

Q. Then Teske had piled manure on the grade to hold the water from flowing over so it couldn't wash. He was there pretty near one day and night packing manure on it so it wouldn't wash the grade out. It was not all night that he was there but part of the night and all day hauling manure and putting it on and repacking it so it would stay there to save the grade.

Q. And what quantities of water went over there in 1916?

A. I wasn't over there.

Q. You say you were there afterwards?

A. Yes sir.

Q. But you weren't there when the water was actually going over?

A. No sir, not when it was high. I seen it when it ran
1545 to the north, but not when it was high.

Q. Well, what would be your idea as to the quantity going over there as compared with 1916, 1897 and 1888?

A. Well from the looks of it I think there must have been most as much water going in 1917 as in the spring of 1916.

Q. And from appearances there would you judge about the same length of time?

A. I would judge so, yes.

Q. And how about conditions are your buildings there in the spring of 1917 as compared with prior times?

A. They was about the same.

Q. As in 1916, 1897 and 1888?

A. Yes sir.

Q. The water going north across your fields?

A. Yes sir.

Q. In about the same quantity and weight?

A. Yes sir.

Q. Tell us of the crop conditions on your farm and the surrounding farms in 1916?

A. Well, it was not very good.

Q. Why?

A. On account of too much rain and hot weather.

Q. And as to the saturated and wet condition of the soil on your farm and the farms around you there, Mr. Neumann through the season of 1916 as compared with prior years, what would you say?

A. It was very wet.

Q. As compared with other years?

A. It was wetter.

Q. Wetter than it ever had been before?

A. Yes sir.

Q. Mr. Neumann, did you have anything to do with the
1546 construction of this last section of the Mustinka state ditch, I mean with the getting of the appropriation for the last section of the Mustinka state ditch?

A. I don't know. We was down here at the legislature at the time.

Q. In 1909 was that?

A. It was some of them years. I don't exactly recollect the year, but it was thereabouts.

Q. Did you give some testimony before the committee?

A. Why they asked me some questions here at the time.

Q. What was the purpose of coming down here and appearing before this committee?

A. We thought we was going to get relief from some of the overflow water.

Q. If you got this ditch constructed as this last section of it was constructed?

A. Yes sir.

Q. Well, now, did you get that relief after the construction of that ditch?

A. It doesn't seem so.

Q. Has it so far as you have observed been of any benefit whatever so far as those flood conditions are concerned?

A. No.

Cross-examination.

By Mr. Bronson:

Q. I notice that the plat and map of Redpath township calls this Twelve Mile creek Mustinka river.

Mr. Palmer: Objected to for the reason that this witness is not responsible for what it is called on the map.

Q. Has it been known sometimes as the Mustinka river?

A. Not that I know of.

1547 Q. Never called it that, this branch called Twelve Mile creek?

A. We always called it Twelve Mile creek as much as I know.

Q. Now your farm apparently is at the confluence of the old Mustinka river and this Twelve Mile creek; your land is situated where they flow together?

A. Yes sir.

Q. You have been here a considerable time during the taking of this testimony?

A. Yes sir.

Q. You have heard most of the witnesses testify?

A. I don't know. I heard some of them.

Q. How long have you been here?

A. Well, I was here three days last week and then we was here yesterday and today.

Q. You notice on this map which is complainant's Exhibit 1, the territory in light blue?

A. Yes sir.

Q. Which includes Redpath township, and apparently part of Clifton and up north into Tintah Township, which has been called and designated in the testimony more or less as the delta zone?

A. Yes sir.

Q. And in this Redpath township in this delta zone I understand you have been for several years past a supervisor?

A. Yes sir.

Q. You are more — less familiar with this territory which we call the delta zone, by reason of your long residence in that community?

A. Yes sir.

Q. Now these lands in Redpath township generally are a fine fertile soil?

1548 A. Yes sir.

Q. Capable of raising good crops?

A. Yes sir.

Q. And generally speaking, in this delta zone and in this Redpath township, when spring breaks up or in times of considerable fall of moisture the natural drift and flow of the waters that come down from this moraine zone eastward in Grant county come over eventually into this Redpath township?

A. I suppose so.

Q. Through the Mustinka river?

A. I suppose they do.

Q. And likewise under similar conditions the waters come from the south along Five Mile creek and along Twelve Mile creek?

A. Yes sir.

Q. And as a result of natural conditions, you have existing in the Township of Redpath, and particularly near where you live, the Mustinka river coming from the east and Five Mile creek coming from the south, and Twelve Mile creek also coming from the south, with such streams having a confluence somewheres near your farm in Redpath township?

A. Yes sir.

Q. Now from the early years that you have lived there on these lands the only thing that you could say against them, if anything is to be said in that respect at all, is the question of getting rid of flood waters. Is that correct?

A. Yes sir.

Q. In other words, if these lands were free from flood waters they would be exceptionally fine, fertile, agricultural lands?

A. Not exceptionally. I wouldn't say that.

1549 Q. Good?

A. They would be as good as the others.

Q. And one of your principal concerns therefore in developing Redpath township and the lands in that township, as well as in the delta zone, has been a question of drainage, has it not?

A. Why, I presume the late years it has.

Q. It has been a question concerning which the farmers in that

community have talked for years and years and years way back to 1897?

A. I wouldn't say that.

Q. Back to 1909?

A. Well, something about there, yes.

Q. And as a matter of fact you know that you along with Mr. Krenz, and Mr. Ringdahl and two of your brothers and a number of other farmers came down here in the winter of 1909 and 1910 to the legislature to make an appeal to the legislature to get relief from conditions existing?

A. Yes sir.

Q. And you came down here for the purpose of getting the state of Minnesota to assist you farmers situated up in that territory in getting relief from flooded conditions then existing?

A. Yes sir.

Q. Now you have spoken in your testimony about the fact of flood waters existing there in the spring time from year to year, when there was either the snow or the moisture necessary to make flood waters, by reason of which in the spring the waters went north into the Tintah slough?

A. Yes sir.

Q. Also, if I understand your testimony, it is to the effect that up to the year 1915 in times of considerable snow in the winter time or heavy rain in the spring it was quite the usual thing for flood waters to go in a northerly direction and over into the Tintah
1550 slough?

A. Yes sir.

Q. That condition you observed in the year 1888?

A. Yes sir.

Q. And in the year 1897?

A. Yes sir.

Q. And in other years?

A. Yes sir.

Q. Up to the year 1915?

A. Yes sir.

Q. Now whenever the waters went over into the Tintah slough—and you know what I mean by speaking of that, generally, do you not, the Tintah slough?

A. I think so.

Q. There was always a condition existing where the old Mustinka river east of your farm was outside of its banks?

A. Well, it wasn't just exactly on the east side of it. It was on both sides.

Q. What I am trying to find out is whether or not whenever waters were going over into this Tintah slough at the times we have been talking about, was it not always the condition that the old Mustinka river was then overflowed east of you?

A. Why, I think so, yes. I will say yes.

Q. Now apparently in this region that I have been talking about when the flood waters of the spring came, owing to the considerable snow in the winter, or when they might occur in the summer, the

waters would come down the old Mustinka, and come down Five Mile creek and would come down Twelve Mile creek, and when they came down there at or near your farm the channel of the old Mustinka near your place was not sufficient to carry off such flood waters as they came down, so that as a result of such condi-
1551 tions the banks of the stream, of the old Mustinka river and Five Mile Creek, and perhaps at times a portion of Twelve Mile creek, would overflow the surrounding lands?

A. Yes sir.

Q. And you would have a condition existing there as you have described in your testimony on direct examination of the water apparently backing up, as you described it, from Twelve Mile creek back even over into Five Mile creek for a temporary time?

A. Yes sir.

Q. And that condition might exist a week or ten days?

A. Yes.

Q. Then when the water got high enough in these flood conditions to get out of the banks of the river and over the land it would start then to go over—some of it—into this Tintah slough?

A. Yes sir.

Q. And the conditions existed in years of considerable snow or of considerable rainfall up until the year 1915?

A. Yes sir.

Q. Now in 1896, this first state ditch was constructed?

A. I think it was.

Q. Do you remember about its going through the Redpath sloughs?

A. Yes sir.

Q. In the spring of 1897 were you up along this ditch?

A. I don't think I was.

Q. Have you ever gone to Norcross in the years you have lived there?

A. Yes sir.

Q. Have you been there sometimes in the spring?

A. Yes sir.

1552 Q. Do you recollect of being there any time prior to the year 1897 at Norcross in the spring?

A. Well, I can't just say what date, or anything like that, but we have been going up there for years, off and on, more or less.

Q. And have you had occasion to observe up to the year 1897 the conditions of flood around Norcross at different times?

A. Well, in flooded seasons I don't think I have been up there, only one spring that I seen part of it.

Q. And you saw some wet flooded conditions up there then?

A. Yes sir.

Q. To what extent did the construction of the first ditch serve to bring down waters from Grant county in your opinion?

A. I don't think it brought down any.

Q. You say that you saw the ditch constructed, have gone along it?

A. Yes sir.

Q. And it went up towards Norcross or the Great Northern railroad?

A. Well towards that way.

Q. And do you think the ditch carried any more water than the old Mustinka river did before?

A. Sometimes.

Q. You think the ditch was bigger than the old river was before?

A. No.

Q. You think it was smaller?

A. I don't mean that way, but it would be blocked up with snow and ice and it wouldn't take any.

1553 Q. Well, I want to speak of a condition when it is not blocked with snow and ice. Would it carry more water then?

A. I don't think it would.

Q. And would it carry water any faster than the old river?

A. A portion of it might carry it faster.

Q. And a portion not faster?

A. Yes.

Q. Now when you appeared down here before the legislative committee did you testify before that committee that the construction of this first Grant county ditch caused some of your lands to be overflowed down here and some of your neighbors?

A. I don't remember.

Q. Will you say that you didn't so testify?

A. I don't remember. I know I didn't say very much here. They didn't ask me but just a few questions.

Q. What did you say about that Grant County ditch, as you now recollect before that legislative committee?

A. I don't remember.

Q. Have you no recollection at the present time?

A. That is I couldn't state anything particular that I did say.

Q. After this first Grant county ditch or state ditch was constructed, I understand from your testimony that water that formerly came down the old Mustinka river, a portion of it then came down the Grant County ditch to Twelve Mile creek?

A. Yes sir.

Q. So that this Grant County ditch served to carry water which formerly went around the old Mustinka river?

A. Grant county ditch, did you say?

Q. Yes.

A. I don't know anything about the Grant County ditch.

Q. Well I mean the first section of the state ditch?

1554 A. Yes, that emptied into Twelve Mile creek.

Q. My question is that this first section of the state ditch, after it was constructed, served to carry down waters to Twelve Mile creek which the old Mustinka river formerly carried?

A. Yes sir.

Q. And as a result of that construction you had coming down the Twelve Mile creek in the spring waters that formerly didn't come down that way?

A. Yes.

Q. And you noticed some backwater conditions existing by reason of that fact, after this first section of the state ditch was constructed, coming from Twelve Mile creek?

A. I don't understand you right.

Q. You have testified in your direct examination about Twelve Mile creek waters coming down by or near your farm or to your farm, and apparently at times they would backwater over towards five mile creek?

A. Yes, it would come down to the point and then go back again up the Mustinka.

Q. Towards Five Mile creek?

A. Yes.

Q. And you noticed that condition to exist after the construction of the first section of the state ditch which emptied waters into Twelve Mile creek that formerly went around by the old Mustinka river?

A. Well, some years it came down first in the old Mustinka and at times it would come around and come down Twelve Mile creek first.

Q. No, that is not the question. My question which I have directed to you now is whether or not you observed that
1555 backwater condition to exist after the construction of this first section of the state ditch?

A. I can't get your question right in my mind.

Q. I ask you again whether or not you have observed this backwater condition of waters from the Twelve Mile creek to exist after the construction of this first section of the state ditch?

Mr. Palmer: Objected to for the reason that the witness has not testified to any backwater of Twelve Mile creek.

Q. Do you understand my question?

A. No, I don't really.

Q. You have already answered my question twice that when waters came down Twelve Mile Creek under these conditions we have been talking about you have noticed that sometimes the waters would back away from Twelve Mile creek up the Mustinka towards Five Mile creek. Is that correct?

A. Yes.

Q. There is no question about that?

A. No.

Q. Irrespective of what counsel has just suggested to you?

A. There is no question about it.

Q. Now since the construction of this first section of the state ditch which carries waters down and empties them into Twelve Mile creek and which proceeded then along Twelve Mile creek up towards your farm, I am asking you now if you observed that backwater condition to exist after the construction of that ditch?

A. Yes sir.

Q. Now there is no question, is there, Mr. Neumann, that Twelve Mile creek, after the construction of the first section of the
1556 state ditch carried more water up towards your farm than it did before?

A. At times.

Q. Because it had to receive, as you have already explained, waters that came down this first section of the first state ditch?

A. Yes, when they came.

Q. And there is no question but what they came sometime, is there?

A. Well, whatever there was left then.

Q. Well, the ditch was there?

A. Yes sir.

Q. And the ditch carried water?

A. Sometimes.

Q. And when the ditch did it carried water to Twelve Mile creek?

A. When it carried it.

Q. And when it emptied into Twelve Mile creek it added something to Twelve Mile creek it didn't have before?

A. I wouldn't say that either.

Q. Did it or did it not add more water at the junction at Sections 18 and 20 in Redpath township than it had before, where the first section of the ditch empties into Twelve Mile creek?

A. Not all the time.

Q. Did it some of the time?

A. It did some of the time.

Q. Now after the construction of this first section of the state ditch did the old Mustinka river carry, under these flood conditions in the spring, as much water as it did before?

A. At times it did I will say.

1557 Q. And sometimes more or sometimes less?

A. When the ditch is filled up it will go on both sides. When the ditch is filled up in the spring it will go down on both sides before the ditch is opened.

Q. The ditch did open in the spring, didn't it?

A. Later on, yes.

Q. And when that opened up the water ran it?

A. Some of it.

Q. But until the ditch did open up the Mustinka river carried all the water and just as much as it ever did before?

A. Where it could get into the Mustinka.

Q. And after the ditch opened up did the Mustinka river continue to carry as much as it did before?

A. Why, not from what was going. It only took care of that what was left on the outside of the ditch then.

Q. The ditch took care of that?

A. I suppose it did.

Q. Now you have been talking about County ditch No. 10 and about a roadway constructed along there something like 3 feet high, as I get it, generally speaking. Is that correct?

A. About there.

Q. And across this roadway I get it from your testimony that there are perhaps some draws which this ditch crosses?

A. There is one or two.

Q. And the roadway was constructed across those?

A. Yes sir.

Q. What waters does this ditch serve to bring down and from where?

A. What the state ditch can't take.

Q. County ditch No. 10 serves to bring down such waters as the state ditch can't take?

1558 A. It seems so. It spills over there and goes up there. It can't get into the state ditch so it flows northerly and it goes into them ravines and keeps on flowing northerly, and in this case they went down to Teske's and then there was one at Satterback's place, somewheres in about at the northwest corner of Section 9.

Q. Does County Ditch No. 10 flow westerly and into the Mustinka river?

A. Yes sir.

Q. And does it serve to carry waters from the east at its eastern extremity westward into the Mustinka?

A. Part of it.

Q. And does this embankment three feet high constructed along that ditch serve to keep the waters back that formerly went northward?

A. It kept it back at Section 9. The little draw that was there—it kept that back.

Q. Does this ditch that you have mentioned so constructed serve to bring any waters down here to the Mustinka river, where it flows into it, that formerly didn't come down there?

A. It might bring a little from Section 11.

Q. The general slope, as I get it, from your testimony, Mr. Neumann, of this territory that we are talking about is northerly and northwesterly?

A. I think so.

Q. And these surface waters in this Redpath Township and in Clifton township, generally speaking, have their method of exodus or going out northerly or northwesterly?

A. Yes sir.

Q. Now there is no question but what, in a state of nature, before any of this ditch construction was created, up here towards

1559 the southwest corner of Section One the old Mustinka river was insufficient to carry off some flood waters that came their occasionally from *the* spring to spring and they overflowed the lands?

A. You mean Section One, Monson Township?

Q. Yes, about Section One?

A. Well, I think that that is *the* partly the reason because it can't take it there and it is a little lower there and it goes across.

Q. Now just viewing the situation broadly, as I get it from your direct testimony, when these waters came down in the spring time and some time in the summer from year to year in a state of nature, when they came down at the end of Twelve Mile creek and at the end of Five Mile creek, and when the old Mustinka river came down to Five Mile creek, the channel of the Mustinka after you get by

Twelve Mile creek and after you get by Five Mile creek wasn't sufficiently large to take off the flood waters that then existed, so that as a result you had a situation existing there during the different years in a state of nature where the banks of the old Mustinka were overflowed and where Five Mile creek was a little overflowed and where sometimes the waters that couldn't get away went over northerly into the Tintah slough?

A. Yes, some of it.

Q. That situation is correct, generally speaking, is it not?

A. Yes sir.

Q. Well, now, you have been down in Clifton township frequently, haven't you?

A. Why, sometimes.

Q. Acquainted with it down there?

A. Why, not so much acquainted only that I went over there a good many times.

1560 Q. You have seen this ditch construction go in there from time to time,, as you have lived there?

A. In Clifton?

Q. And in Redpath also?

A. In Redpath I have.

Q. You have seen those ditches south of County Ditch No. 10 put in, various ones, pretty near one on every section?

A. Yes.

Q. And generally speaking, they carry such waters as they do carry easterly into Twelve Mile creek on the east side of Twelve Mile creek, and one of them and perhaps a few of them into Five Mile creek?

A. Yes sir.

Q. And those ditches were constructed in Redpath township for the purpose of helping drain the land, were they not?

A. Why *it* that was the purpose, but not exactly.

Q. You don't dig a ditch to drain land?

A. There was a good many of them made—there would be one petitioner to get a ditch started and file a petition and hire an attorney and the attorney would see that the ditch would go in whether it was going to do any good or not.

Q. You have some attorneys like that up there?

A. We have them, I guess, all over.

Q. And so you got this bunch of ditches not to drain the land but to please the fancy of some attorney?

A. It seems so.

Q. And you farmers have been paying for it?

A. Well, fortunately, I have not.

Q. You seem to be willing to pay for it because there are more ditches under contemplation?

A. Well, I haven't paid for any. Yes, I did too, but I 1561 only paid a litle assessment of $50 for the ditches in the vicinity of my place.

Q. Those that go near your place?

A. Yes.

Q. Now, do I understand from your testimony, Mr. Neumann, that the county ditches in Redpath township have not been of any benefit to the land?

A. Well, I think that they hadn't been very much benefit.

Q. Will you say that they have not been of any benefit?

A. I will say they haven't been of any benefit.

Q. And will you say the construction of the first state ditch was not of any benefit to the lands easterly of the first state ditch?

A. That I don't know.

Q. Will you say that the construction of the cut-off ditch did not serve to take off some waters that formerly went around by the old Mustinka river?

A. It takes off some water when it is running.

Q. And will it take it off faster than they used to go around by the old Mustinka river?

A. I don't know whether it would.

Q. And do I understand also by your testimony that the construction of the ditches farther south likewise were not of any benefit to that land in Clifton township for instance?

A. I wouldn't say — to that because I ain't so well acquainted that I know whether they do any draining there.

Q. Now you spoke of the old Mustinka river opening up sometimes a little quicker than Twelve Mile creek in the spring?

1562 A. No, I don't think I said that. I said it comes around by way of the Mustinka first sometimes.

Q. About four days sooner?

A. Yes, three or four or five days.

Q. And counsel asked you a question about the size of the old Mustinka and Twelve Mile creek. Now is or is not the Mustinka river east of you lower in the banks?

A. Yes sir.

Q. And somewhat shallow?

A. Yes sir.

Q. When was your flood in 1917?

A. Well, it was in the latter part of March, I think.

Q. And when was it all gone?

A. The flood gone?

Q. Yes?

A. Why I couldn't say exactly as to that either.

Q. You put your crops in in 1916?

A. Not all.

Q. Some wheat?

A. Yes sir.

Q. Some oats and barley?

A. Yes.

Q. Harvested them?

A. Harvested the wheat.

Q. And your oats?

A. I didn't harvest it.

Q. You didn't have any to harvest?

A. I didn't harvest it.

Q. You did have some in?
A. Yes sir.
Q. How much?
A. Something like 26 acres.
Q. And some barley in?
1563 A. Yes sir.
Q. Harvest that?
A. Some of it.
Q. What was the grade of your barley in 1916?
A. Why some of it I threshed and some I just stacked and fed it the way it was so I don't know.
Q. You have no idea?
A. No.
Q. Now you spoke of the crop being poor in 1916?
A. Yes sir.
Q. On account of wet and hot weather?
A. Yes sir.
Q. Did you have rust there in Redpath township in 1916?
A. I don't know whether there was any rust to speak of much.
Q. Was the grain shriveled up any?
A. It was.
Q. Of poor quality and light weight?
A. Yes.
Q. And that condition was quite general through Traverse county was it not?
A. Yes sir.
Q. In 1915 did you have a good crop?
A. Fairly good.
Q. That is a cereal crop, wheat, oats, and barley, and so forth?
A. Yes sir.
Q. In 1914 did you have a good crop?
A. Fairly good.
Q. Do you recollect how much you put in in 1915?
A. I couldn't say exactly. I had somewheres I think
1564 about 130 acres of wheat.
Q. This Defendant's Exhibit 56, Mr. Neumann, is that the old Mustinka river at your place as it appeared along in May, 1917, apparently?
A. I think that must be the place.
Q. Can you recognize the bridge there and the trees?
A. I think I can.
Q. And is that looking east from where Twelve Mile creek flows into it?
A. This is looking east.
Q. From where Twelve Mile creek flows into the Mustinka river?
A. Yes from the point looking east.
Q. Was that overflowed in the spring of 1917?
A. Yes.
Q. That bridge?
A. Yes.
Q. Water over it?

A. Yes sir.
Q. Water in among the trees there?
A. Yes. Not all over. There was in here, right across here.
Q. That is on the north and south side?
A. Yes sir.
Q. In 1916 was that all overflowed?
A. Not all, but places.
Q. Over the bridge?
A. Yes.
Q. And in among the trees?
A. Some.
Q. Did you have a boat in 1916?
A. No sir.
1565 Q. And you didn't have any in 1888 or 1897 either?
A. Well, there was some of the years I didn't have a boat, no.
Q. And for that reason you couldn't go up there in 1897 to see what the conditions were up there?
A. No.
Q. What did you need a boat for in 1888 and 1897?
A. For pleasure.
Q. To go fishing, you mean?
A. Yes.
Q. What did you need that in 1888 to go up to this bridge for. Couldn't you walk?
A. In 1888?
Q. Yes.
A. Why, I don't think we had a boat then.
Q. You say the spring of 1916 was the wettest year you ever saw?
A. Not exactly, no.
Q. You say the summer of 1916 was the wettest year you ever saw?
A. Yes.
Q. Was the flood any wider than it was in the spring of 1916?
A. Yes.
Q. Was there any more water on the land than there was in the spring of 1916?
A. Why part of the time in the spring it was so nice and dry you could work any place and then after a while you couldn't do a thing.
Q. After the floods came?
A. After the rain came.
Q. And you had two seasons in 1916 when it was wet?
1566 A. We had in the spring and then we had about the middle of May it started and was wet all the time, that is up until in July.
Q. Now Mr. Neumann, as a result of all this testimony that you have given concerning the construction of this first section of the state ditch and the effect of this cut-off, as far as you are concerned, and as far as your observation goes and what you have seen, it wouldn't do a bit of harm if they should go and fill up this cut-off ditch?

A. I don't think it would.
Q. And put it back the way it used to be?
A. No.

FRANK WOLK, having been called as a witness on behalf of the defendant, was duly sworn and testified as follows:

Direct examination.

By Mr. Palmer:

Q. Where do you live?
A. Town of Monson, Traverse County, Minnesota.
Q. On what section?
A. Section 3, on the Northeast quarter.
Q. How long have you lived there?
A. Since 1888, that is on that place. Otherwise I was in the town of Monson since 1885.
Q. Where did you live the first three years?
A. On Section 11, town of Monson.
Q. What part of 11?
A. South half of Section 11.
Q. Did you own that South half of Section 11?
A. No, I rented it.
1567 Q. Were there buildings on it?
A. Yes sir.
Q. Well, you lived on the south half of Section 11 from 1885 to 1888?
A. Yes sir.
Q. Did you farm it and cultivate it?
A. Yes sir.
Q. What was its condition as to cultivation?
A. We farmed the whole half section.
Q. Was it all broke?
A. With the exception of ten acres in pasture.
Q. Where was the pasture?
A. There was a kind of draw in there and we had it in there.
Q. Where does that draw come in?
A. It comes from the section adjoining on the east, Section 12.
Q. You say there is a kind of ravine or draw across Section 12 and running into the south part of 11?
A. Yes sir.
Q. Did the water come along there?
A. Yes sir.
Q. *Did the water come along there?*
A. *Yes sir.*
Q. From which direction?
A. From the east.
Q. Down across and into the river?
A. Yes, sir, the Mustinka river.
Q. The Mustinka river runs north and south right across section 11?

A. Yes sir.

Q. And have you known this south half of Section 11 ever
1568 since you lived on it?

A. Yes sir.

Q. Is it an improved farm still?

A. Yes sir.

Q. Good buildings on it?

A. Yes sir.

Q. And what has been its condition as to cultivation since you left it?

A. It is about the same.

Q. Who lives there?

A. I can't tell. I think it was a man by the name of Binder. He had it rented.

Q. In those days that you lived there from 1885 to 1888 was there any overflow of the river at that point?

A. Yes, sir.

Q. Where you lived?

A. Yes sir.

Q. Where did the water go?

A. That went over the whole lan[illegible]cause the river was full of snow and ice then. That was early in [illegible]e spring.

Q. Early in the spring there would be a spreading out of the water over the land?

A. Yes sir.

Q. How long would that last?

A. About a week.

Q. Did it interfere with your cultivation of the land?

A. No, it didn't.

Q. What was the condition of the channel of the river in those days in Section 11?

A. It has got good banks there.

Q. And about how wide was the channel?

A. Well, I judge about three rods right there.

Q. And how deep?

1569 A. Well, we will say about six or seven feet.

Q And the amount and volume of water there, Mr. Wolk, did you observe it at that time.

A. Yes, it was about—over there I guess it was over a mile wide.

Q. In the early spring?

A. Yes.

Q. Now have you observed it in recent years, in 1915, 1916 and 1917?

A. Well, I have seen it, yes.

Q. Which years?

A. 1916 and 1917, in the spring.

Q. Was there as much water there in 1916 and 1917 along the river overflowed as you saw there back in the years from 1885 to 1888?

A. Yes sir.

Q. Was there any more there in 1916 than you ever saw there before?

A. Well, no, I guess it was about the same as it was in 1888.

Q. And have you noticed the river channel there on Section 11 other that in times of flood?

A. Yes, sir.

Q. I mean since this cut-off ditch was put in?

A. Yes sir.

Q. How does the amount of water running there compare with what used to run there when you first knew it?

A. I guess it was about the same.

Q. You think it was about the same amount?

A. Yes, I think it was about the same amount.

Q. Have you lived on a farm continuously since 1888, this land in Section 3 of Monson?

A. Yes sir.

1570 Q. Now do you own some other land over in Section 1, Mr. Wolk?

A. Yes sir.

Q. What part of Section 1 do you own?

A. The northeast quarter.

Q. That would be the quarter immediately north of Mr. Teske's quarter?

A. Yes sir.

Q. How long have you owned that?

A. Since 1896 in the fall.

Q. Who owned it before that?

A. The railroad company.

Q. Was it improved before you bought it?

A. No sir.

Q. After you got it in 1896 did you improve it?

A. Yes sir.

Q. In what way?

A. I broke it up.

Q. What part of the quarter were you able to break up?

A. Well I broke up about 170 acres. You know there is fractions. It is 210 acres in all.

Q. And you put it under cultivation?

A. Yes sir.

Q. Now have you cultivated it ever since 1896?

A. Yes sir.

Q. Continuously each year?

A. Yes, sir.

Q. The whole 170 acres?

A. Yes sir.

Q. What part of it remains uncultivated?

1571 A. There is kind of draws in there, or you might as well call them ravines, leading through there from Teske's lake, and then that follows on my land, the ravines, and so there is one starting in on the east side and going west into this ravine and coming up by Teske's.

Q. You notice this map, Exhibit 4?
A. Yes, I have seen it.
Q. Is this draw on the Teske farm and coming on across the southwest quarter and continuing on northerly up the west side of your quarter substantially correct?
A. Yes sir.
Q. As shown on this map?
A. Yes sir.
Q. And then this draw coming in from the east side, running southwesterly and over into the first draw described?
A. Yes sir.
Q. Is that shown here substantially correct?
A. Yes sir.
Q. Is any part of this Tintah slough on your land?
A. Yes sir.
Q. Which part?
A. That is the northwest corner of my quarter.
Q. In the northwest corner of your land is a part of this Tintah slough?
A. Yes sir, these draws go right into what they call the Tintah slough.
Q. You recollect the construction of this Judicial Ditch No. 3 draining the Tintah slough?
A. Yes sir.
Q. The end of that is immediately north of your quarter?
A. Yes sir.
1572 Q. How far north?
A. A mile north.
Q. Have you buildings on this northeast quarter of Section 1?
A. A little shed for the horses and a granary.
Q. Do you cultivate this land yourself in connection with your home farm?
A. Yes sir.
Q. Did you know this northeast quarter of 1 before you bought it?
A. Yes sir.
Q. Did you know what conditions there were as to overflow on that land prior to the time you bought it?
A. Yes sir.
Q. And was there at times of overflow any water upon it?
A. Only in these draws.
Q. How wide is that draw in the southwest corner and up the west side?
A. I should judge about five rods, I guess, but it flattens out gradually. It is kind of low there about twenty rods, I guess.
Q. Now this one on the east side, how wide is that?
A. Well, that is about five or six rods.
Q. Now before you bought the land in 1896 can you recollect any year that it was overflowed in those draws running across the land?
A. No, not very particularly. I have seen floods there but I didn't pay so much attention to it then as I do now after I have the land.

Q. Since you got it in 1896 what years do you remember of the water coming across there from the south?

1573 A. Well I know of 1897, and we had a couple of floods afterwards, but I don't remember them, and then in 1915, 1916 and 1917. But we had a couple of floods before, but I can't remember the dates.

Q. Now in 1897 just tell what you saw there?

A. Well, it was practically all water there over what we call the slough here; it was all water, mine and the adjoining quarter.

Q. Adjoining quarter which way?

A. West.

Q. Seemed to be practically all water?

A. Yes sir.

Q. For how long a time?

A. Oh, we will say about a week or ten days.

Q. Where did the water come from?

A. From the south.

Q. From what?

A. From the river.

Q. From the overflow of the Mustinka river?

A. Yes sir.

Q. And came up where?

A. Coming north through my land there.

Q. Through whose place first?

A. Teske's.

Q. Which side of the Teske buildings?

A. South from mine.

Q. Which side of that quarter?

A. It came from the southeast corner.

Q. It came across at the southeast corner of Teske's farm?

A. Yes sir.

Q. And then went in what direction?

1574 A. Came in a northwesterly direction.

Q. Now it was testified to here by Mr. Ralph that the water went off in a northeasterly direction and then got into a kind of a channel up there in Section 6 and came into your land from the east side there, this overflow water from the Mustinka river. Is that so?

A. No, not that I know.

Q. Do you know of the water ever coming that way?

A. I have seen some of it this last year.

Q. Coming which way?

A. From the east in the ravine, as far as my land is I mean.

Q. Is that water that came up from the overflow from the Mustinka river?

A. Yes sir.

Q. And following what direction?

A. In the ravine it follows in a southwesterly direction. It enters on the east side. The water is coming up the road. The road is graded and it has ditches, and it enters into this ravine and comes in a kind of southwesterly direction until it strikes this other ravine going in a northwesterly direction.

Q. Then part of it comes straight up the road to the north?
A. Yes.
Q. Until it strikes the ravine on your east side?
A. Yes.
Q. And then runs in a southwesterly direction as indicated by this draw over into the other draw?
A. Yes sir.
Q. Now part of it, you say goes right northwesterly through the Teske lake?

1575 A. Yes sir.

Q. In 1897 you say your quarter and the quarter to the west, the northwest quarter of 1 appeared to be nearly all water?
A. Yes sir, for a week or ten days.
Q. Now tell us about the other years that you saw it there prior to 1915, giving the years and tell us what you saw? You say you can't give those years?
A. No sir, I can't. Well then it wasn't so much water as in 1897, and there is three or four of these draws leading through Section One and they was all full of water going north. We will say some of these ravines were about six rods wide and some wider yet. They were kind of shallow.
Q. And those go through, as indicated here, the northwest Quarter of One, as well as your northeast quarter?
A. Yes sir.
Q. Now in 1915 you say you saw water coming across your quarter there from the south?
A. Yes sir.
Q. What part of the year?
A. In the spring.
Q. Of 1915?
A. Yes sir.
Q. How much?
A. Well, by my land it was about twenty rods wide.
Q. How long did it flow there?
A. About a week.
Q. Now the summer of 1915 did the water go across there?
A. I don't know. I can't tell. I forget it.
Q. You can't remember distinctly about that?

A. No.

1576 Q. Can you remember whether it was in the spring or summer of 1915 that you saw it or both?
A. I think it was in the summer.
Q. That is, it was after the spring break-up?
A. Yes.
Q. Now in the spring of 1916, tell us about that.
A. There was a flood in the spring and afterwards in June.
Q. How much of a flood there in the spring?
A. Well, there was about—it ran over the road in some places 20 or 25 rods and some places 10 rods and so on.
Q. What road do you speak of?

A. Of the road leading from east to west on the north line of the town of Monson north of my land.

Q. The east and west road along the north line of Section 1?

A. Yes sir.

Q. You say the water was going north there in quite a number of different places?

A. Yes sir.

Q. Some places twenty rods wide and some ten?

A. Yes sir.

Q. How did it go—fast or slow?

A. Fast.

Q. How do you know that?

A. Well, it was a kind of turn-pike, kind of high filled up.

Q. A kind of grade?

A. Yes, sir, and it went over there and took part of the grade away.

Q. How many places did it wash away the grade?

A. At my place there, and then there is a bridge and
1577 it took the dirt away there, and then there is a culvert more west and it washed that out entirely—that is it washed the dirt away.

Q. Now was this culvert on your land, or where was it located?

A. Well, that is on the north line—it is about we will say, thirty rods from the northwest corner.

Q. Of your land?

A. Yes, that is on the northeast quarter.

Q. Where was the next one located?

A. That was on the quarter section west of mine. That is a kind of bridge.

Q. What did you say the water did to that bridge?

A. It took all the dirt away on both sides so they couldn't travel there.

Q. And farther west you say was a culvert?

A. Yes sir.

Q. What did it do there?

A. It took the dirt away on both sides.

Q. Now for how long a time did these floods conditions across this section 1 continue in the spring of 1916, Mr. Wolk?

A. About eight or ten days.

Q. What will you say as to the quantity of water that you saw going over there in 1916 as compared with 1897?

A. Well, I should judge it was about the same.

Q. I wish you would tell us something of the conditions there in June, 1916?

A. Well, I kind of think it was the same as in the spring, pretty near.

Q. Do you think there was as great a quantity of water going over there in the summer of 1916 as there was in the spring of 1916?

1578 A. Yes sir.

Q. And for as long a period of time?

A. Yes sir.
Q. Where did this water come from Mr. Wolk?
A. It came across Teske's land.
Q. From what?
A. From the northeast corner, from Teske's land.
Q. Was it overflow water from the Mustinka river?
A. I guess so.
Q. Well, do you know of any other source of it than that?
A. No sir.
Q. At the time of these floods is there any other point at which the water goes over on to Section 1 besides this Teske place?
A. I don't think.
Q. Do you know of any water going over by Mr. Krenz' place, by his buildings in the southwest quarter of section 1?
A. I didn't see it that year. I wasn't there. It was too much water. I tried to go there, but it was too much water. I had to go through these ravines to get there.
Q. So whether there was water going across there at the Krenz place as testified to by Mr. Krenz, you don't know much about that?
A. No, I only seen that the water came across there to-, and I tried to look things over and I had to stop. I wasn't close to the river. I was about 160 rods away.
Q. The water came from that direction?
A. Yes sir.
Q. And that water was traveling in what direction?
A. Well, it is a draw and it travels a little northeasterly
1579 there, and the draw is coming out of Section 2 there crossing the road, and——
Q. Passing on northerly?
A. In a northeasterly direction, yes.
Q. Mr. Wolk, tell us about the spring of 1917?
A. There was a flood in the spring.
Q. What time?
A. I don't know exactly, but first it was dry, and afterwards we had a flood and it was rain and so wet we couldn't hardly go any place, so it must have been in the latter part of April, I think, but I ain't sure.
Q. What were the conditions upon this northeast quarter of section 1 as to flood waters in 1917?
A. Well, after it got dry we seeded the land, put it in crop about in May, well, say about the first part of May.
Q. Did it make your seeding late?
A. Yes, kind of late.
Q. Tell us about the flood conditions there in the spring of 1917?
A. Well now, that land that was under cultivation the flood water don't go over at all. I only got the water in these draws. The other land is high.
Q. How much flood waters did you see going over there in 1917 as compared with 1916?
A. I think it was about the same. It was anyway just as wide crossing the road.

Q. You think it was just as wide crossing the road as in 1916?
A. Yes sir.
Q. For how long a period?
A. About a week or a little more probably.
Q. And was it there just as long, flowing across just as long a period as in the spring of 1916?
1580 A. Yes, I would think so.
Q. Did you see any water coming from the southwest corner of section 1 or from that direction in the spring of 1917?
A. No, I didn't, but it went over the road in that draw, but I wasn't far enough up. It went over the road there in the same place.
Q. It went over the road at your westerly corner that you have described?
A. Yes sir.
Q. Did it wash out the grade there again along the north line of Section 1?
A. Yes sir.
Q. As much so as in the spring of 1916?
A. Well, I guess the bridge was a little more washed out than in 1916.
Q. And the other points of the grade, did it wash them out as much as in 1916?
A. I guess so.
Q. When you say you guess so do you mean that that is your best judgment upon it?
A. Yes. Now I am going to state that you know in 1916 it took some of the grade away so it was lower and they didn't fix it and then when the water crossed it the next year it seems to me it was steeper, but then the roadbed was lower down.
Q. Do you recollect the time of the construction of Judicial Ditch No. 3 draining the Tintah slough?
A. Yes sir.
Q. Do those flood waters that you describe as going across section 1 go into that ditch?
A. Yes.
Q. Has that ditch been of benefit to your land in Section 1?
1581 A. Yes sir.
Q. In what way?
A. It takes the water quicker. In the early days when they didn't have the ditch it didn't go off so quick as they do now.
Q. It goes off more quickly from Section 1 since the construction of the Tintah slough ditch than before?
A. Yes sir.
Q. Prior to the construction of this Tintah slough Judicial Ditch No. 3 what was the condition of this Tintah slough as to standing water?
A. Well, the water was standing there longer than it does now.
Q. Would it stand there during the entire season?
A. Sometimes it did.
Q. Does it now?
A. No.

Q. Was the lands to the north of Section 1 and in this Tintah slough used for any purpose prior to the construction of that Tintah slough ditch?

A. No, it is only used for grass north of this section 1. Some of it is under cultivation, but the most of it is grass land.

Q. What is it used for since the construction of that ditch?

A. For grass, that is north of me. Farther up north again I guess they have cultivated to the ditch.

Q. Mr. Wolk, from your knowledge of the conditions there and your observation would you say that there is any less water overflowing from the Mustinka across section 1 and into the Tintah slough since the construction of this Mustinka state ditch
1582 than there was before?

A. I think it is the same now.

Q. You think there is the same quantity going across there now?

A. Yes sir.

Q. Did you testify before the legislative committee?

A. No sir.

Cross-examination.

By Mr. Bronson:

Q. How long did you own Section 11?

A. I never owned it. I rented it.

Q. In what years?

A. From 1885 to 1888.

Q. And lived on it?

A. Yes sir.

Q. Then you moved up to the northeast quarter of Section 3 afterwards?

A. Yes sir.

Q. Now in 1888 you say you saw a flood there?

A. Yes sir.

Q. East of you?

A. No, it was a little on the west side too. It was we will say about forty or fifty rods too, but on the east side it was a mile east there.

Q. Was the Mustinka river overflowed there by your farm?

A. Yes sir. It flooded the low lands there.

Q. Have you some flat lands along there?

A. Yes sir.

Q. Some low lands?

1583 A. Along the river it is a little lower than further up.

Q. Is it lower or higher in Section 11 than it is over in Redpath township?

A. I guess it is higher the way it looks to me. Probably a part of Section 11—there is a kind of draw through there. Probably that is a little flat.

Q. Generally speaking, the lands in Sections 11 and 12—that is Lake Valley township, isn't it?

A. No sir.
Q. Monson, I mean?
A. Yes sir.
Q. —are a little higher than those over east by the Mustinka in Redpath township?
A. Well, I don't want to say on the east side if it is higher, but it is lots higher on the west side.
Q. You know where Twelve Mile creek flows north and south?
A. Yes sir.
Q. The lands on the west side of Twelve Mile creek are a little bit higher and not so much subject to overflow as those on the east side?
A. No, I can't tell that.
Q. You don't know anything about it?
A. No.
Q. You ever been——
A. I have seen that they have floods, but I don't know anything about it.
Q. Have you ever been up where Twelve Mile creek flows into the Mustinka river?
A. Yes sir.
1584 Q. And you have seen it overflow there in the spring?
A. Yes.
Q. Year after year?
A. Well, several years.
Q. And you have seen water coming from the south there going northward?
A. Yes sir.
Q. And when the spring conditions would come, the snow melt and the spring run-off come you would see the Mustinka river overflow there and go out of its banks and the country flooded with water?
A. Yes sir.
Q. Seen that for several years?
A. Yes sir.
Q. And when the water would get high some of it would go north and go over into this Tintah slough?
A. Yes sir.
Q. And as I understand in 1897 you had a lot of water go over into the Tintah Slough?
A. Yes sir.
Q. And had a regular lake there?
A. Yes sir.
Q. And some of this land you have now got cultivated was then under water?
A. No sir.
Q. None of it?
A. Yes, some of these draws through there.
Q. I mean any of this 170 acres under water?
A. No sir.
Q. That is higher, is it?
A. Yes sir.

Q. But you have 210 acres up there?
A. Yes sir.
1585 Q. Then you had 40 acres flooded in 1897?
A. Yes, that is grass land.
Q. When that water came over there at that time County Ditch No. 10 was not there at that time?
A. No sir.
Q. Now have you been east of your farm towards—well, I will say towards Charlesville?
A. Well, I was as far as Section 9, because I always bought the grass on the land and was making hay on there.
Q. Where is Section 9—in Redpath township?
A. Yes sir.
Q. You made hay over in Section 9?
A. Yes sir.
Q. That land a little low there?
A. Yes, I guess it is the same as all over around there, the way it looks to me.
Q. Kind of low?
A. No lower than the rest of it.
Q. All the same?
A. The way it looks to me.
Q. In the spring of the year have you seen water going north over there?
A. No sir.
Q. Coming from the south?
A. I never was there when it was flooded.
Q. Now where did you see water coming across in the spring of 1897?
A. At Teske's corner.
Q. Anywhere else?
A. Yes, I have seen it one year at Carl Krenz corner on the other side south. Well, it ain't the corner. It is where the river runs from the road there, and between Sections 1 and 2 there on the west side. I have seen it one year but I don't know what
1586 year it was.
Q. Now have you seen this ditch constructed a mile south of you east and west, with a grade up high?
A. Yes sir. There is a road on there. I go there to get the hay.
Q. This road was built by taking the dirt out of the ditch and putting it on the road and making a road along there?
A. Yes sir.
Q. The grade is higher now than it used to be?
A. Yes sir.
Q. The water has to be higher now to get over that grade than before?
A. Yes, I suppose, because the road is higher.
Q. Now do waters flow in that ditch?
A. Not at present.
Q. Did they in 1915 and 1916?
A. A little.

Q. And in the summer of 1916 was there water in that ditch?
A. Yes sir.
Q. Where did it come from?
A. From the east.
Q. Where did it go?
A. To the west.
Q. And into what?
A. The Mustinka river.
Q. And was the Mustinka river overflowed there some where the ditch went into the river?
A. No. Then I haven't seen it. Then I couldn's travel there very well.
Q. You know whether this ditch brings down water that goes over the road and over into the Tintah slough?
1587 A. I can't tell.
Q. Does this ditch up at the Tintah slough drain well?
A. Yes.
Q. Takes off the water quick?
A. Yes sir.
Q. Where does that water go?
A. Into the Rabbit river.
Q. The ditch takes that water quicker than if there was no ditch?
A. Yes sir.
Q. And you say in this Tintah slough there used to be water standing there most of the year?
A. If it was a wet season it was.
Q. And now it don't stand there?
A. Not now for long.
Q. The ditch takes it off?
A. On the north end of the ditch there is hardly any water, but farther up there is such a high bank it can't get in so quick to the ditch and there it stands a while longer.
Q. But the Tintah slough is drier than it used to be?
A. Yes, it is drier now than it used to be.
Q. In the early days when you came there along in 1888 there used to be considerable water standing in that Tintah slough?
A. In wet seasons.
Q. And that would run down past your place into that Lake of Teske's?
A. On what place, 1 or 3?
Q. On Section 1?
A. Yes.
Q. And this ditch has served to take off those waters quicker and faster now?
1588 A. Yes sir.
Q. Did you farm your land in 1916?
A. Yes sir.
Q. This 170 acres?
A. Yes sir, part of it.
Q. And in 1917?
A. Yes sir.
Q. And in 1915?

A. Yes sir.
Q. And when did you break it up, you say?
A. Well, I broke it up right away, but not in the first years. I can't remember how many years it took me to break it up. Probably three or four years. I forget that.
Q. And in the spring of 1917, if I understand you correctly, you saw as much water as you did in 1916 going across?
A. Across the road there?
Q. Yes.
A. Yes, across this road leading from east to west.
Q. On the north line?
A. Yes sir.
Q. Do you know how much came across from the Mustinka river down on Teske's place?
A. No, I wasn't down there at that time. I was there several times, but not at that time. After the flood I was there.
Q. Were you down there in 1916 on Teske's place?
A. After the flood I was down there.
Q. Didn't you go down there during the flood in the spring?
1589 A. No sir, I couldn't travel very well on my road.
Q. Why?
A. The bridge was away.
Q. The summer of 1916 did you go down?
A. Not in the flood time.
Q. Why?
A. Well, there was water running over the road and some washed out and I couldn't go there very well.
Q. Now in the spring and summer I understand you to say it didn't stay there very long, not over eight to ten days?
A. No sir.
Q. Ran off quick?
A. Yes.
Q. Where to?
A. North.
Q. Past your farm?
A. Through my farm.
Q. And it was about eight or ten days going away?
A. Yes sir.
Q. Then you could seed all right?
A. I didn't put that in at all where the water was. It is only in these draws what I mentioned as grass land.
Q. Well, you never put that in?
A. No, but the rest I put in.
Q. It didn't bother you anywhere on this land you broke?
A. No.
Q. So in 1916 you put it in?
A. Some, not all of it.
Q. And in 1915?
A. Yes sir.
1590 Q. And in 1917?
A. Yes sir, I put in every foot in 1917.

Q. And you haven't been bothered on your land except in these draws?

A. Not from flood, but I suffered from rain in 1916.

Q. Now were you down there any time at Teske's place in 1915 and 1916 when the flood was on?

A. No, not that I know of. I think it was after the flood—shortly after the flood.

Q. After the water had gone off?

A. Yes sir.

Q. How long was it after the flood?

A. Well, I can't tell how long it was.

Q. Have you ever been over to Norcross?

A. Yes, several times.

Q. In the spring?

A. No, that was in the early days. These last ten or fifteen years I wasn't there.

Q. Do I understand from your testimony that you were down on Section 11 in 1916 in the summer?

A. Yes, I drove over there.

Q. And you saw the flood there?

A. Yes sir, I went through the water. It went pretty near in the wagon box.

Q. On the highway?

A. Yes sir.

Q. On the road going over there?

A. Yes sir.

Q. On the west line of Section 11?

A. No, on the south line of Section 11. It was pretty near on the corner there. The river makes a kind of bow there and the
1591 road is close to the river at that point and at that point it just went up to the wagon box.

Q. That was in the summer?

A. Yes sir.

Q. Were you down to where the state ditch was at that time?

A. Yes sir.

Q. Was that flooded, too?

A. No, it wasn't filled. It was in its banks.

Q. The water running in it?

A. Some of it.

Q. Full?

A. No, it wasn't full.

Q. Half full?

A. Well, say about half full.

Q. And at that time up on Section 11 the old Mustinka river, as I understand it, was out of its banks and the country east of there was flooded for pretty near a mile?

A. Yes, there is a kind of slough that runs that way and you can see the water.

Q. And as I understood at that time west of Section 11 the water was out of the banks of the old Mustinka river forty to fifty rods wide?

A. Yes sir, about that.

Q. And at that time you drove down to the state cut-off ditch?
A. I drove over it. I had to go over there.
Q. And it was in its banks then?
A. Yes sir.
Q. And was about half full?
A. About I guess, I should judge.
Q. This was the summer of 1916?
A. Yes sir.
1592 Q. There wasn't any snow or ice then?
A. No, this was summer.
Q. When you went down in 1916 you crossed a lot of these ditches, didn't you?
A. No, I didn't. I only crossed one, and that was by my place.
Q. When you went down there in 1916 tell me how you went?
A. Well, I can't say it very well. I live on Section 3. I went a little east to this corner, that is between 3 and 2, and then I followed this up to Section ten and then east a mile.
Q. Did you go south from your farm along County Ditch 36?
A. No, I came from the north and followed that to Section ten, two miles down.
Q. County ditch No. 36?
A. I guess it is.
Q. Was that open then?
A. Yes sir.
Q. Was the water running in it?
A. Not very much. Very little.
Q. Some?
A. Very little. There is not much water at all there.
Q. And then you went east along Section 11?
A. Yes sir.
Q. The south line of Section 11?
A. Across the bridge.
Q. And when you went across the bridge on Section 11 the water was pretty near up to the wagon box?
1593 A. Yes sir, right there by the corner.
Q. At the southeast corner of 11?
A. Yes, it is about the southeast corner.
Q. And then did you go south to the cut-off ditch?
A. Yes sir. I didn't go any farther than that. My son-in-law lives there on the corner, and I visited him several times. That is why I went down there.
Q. Did you go down afterwards to the state ditch or could you see the state ditch from there?
A. Yes, I had to cross the state ditch. They live just in the corner close to the ditch.
Q. And as you went across the ditch you saw the water in it?
A. Yes sir.
Q. And did you come back the same way?
A. Yes sir.
Q. And did you see the Mustinka river there too? Where the cut-off ditch went into it?

A. No sir, I didn't go there. That is about eighty rods west of there. I wasn't there.

Q. Have you seen these ditches here in Redpath township, some of them that go into Twelve Mile creek and some of them that go into the Mustinka?

A. I may have seen them but I didn't pay any attention to them at all.

Q. Have you never noticed them as you went by them?

A. No, I didn't travel there much.

Q. Have you noticed this county ditch by Section 9 where you cut hay?

A. Yes, I went along there.

Q. And did these ditches like 10 and 16 carry off the water from Section 9?

1594 A. I didn't see them only this No. 10.

Q. Did it carry it off faster?

A. When I was there there was not much water to carry off.

Q. Was there some water in the ditch then?

A. About a foot.

Q. Did this County Ditch No. 10 carry off the water the same as the ditch up in the Tintah slough?

A. No, I don't think so.

Q. That is not so big?

A. It is not so big, and I guess there is more water up here. It is only half as big as the Tintah ditch, so it can't take so much water.

Q. If I understand you correctly this ditch up in the Tintah slough carries off the water faster?

A. That is what I think.

Q. You have seen it?

A. Yes, but I am not an expert. I am no engineer.

Q. You know what the Tintah slough used to be and what it is now?

A. Yes, sir.

Q. And you make the observation that it carries it off faster?

A. Yes, sir, that is the way it looks to me.

Q. That is what any ditch will do?

A. Yes, I believe. If it runs into it it will run out quicker if it is fall enough.

Q. Then as you drove down to your son-in-law's along that road you could see water to the east of you and to the west of you?

A. Yes.

Q. The whole country was flooded?

1595 A. Not the whole county.

Q. Well a lot of water, wasn't there?

A. Yes.

Q. And it must have been flooded because the river was out of its banks there?

A. Yes, sir.

(Adjournment taken until Oct. 6, 1917, at 10 a. m.)

October 6, 1917, 10 a. m.

Hearing resumed pursuant to adjournment, with all parties present.

EDWARD RUSTAD, having been called as a witness on behalf of the defendant, was duly sworn and testified as follows:

Direct examination.

By Mr. Palmer:

Q. Where do you live?
A. Wheaton, Traverse County, Minnesota.
Q. That is the county seat?
A. Yes, sir.
Q. How long have you lived there?
A. Since 1889, I believe.
Q. Your age?
A. 49.
Q. Your occupation?
A. Attorney at law and bank president.
Q. How long have you been an attorney at law?
A. Seventeen years.
Q. How long have you been in the banking business?
A. About ten years.
1596 Q. Do you hold some official position?
A. Yes.
Q. What is that?
A. State Senator of Minnesota, 48th Legislative District.
Q. How long have you been state senator?
A. Seven years.
Q. You say you have lived at Wheaton since 1889?
A. Yes, sir.
Q. Did you live prior to that time in Traverse county?
A. Yes, sir.
Q. Where?
A. Browns Valley.
Q. When did your residence at Browns Valley begin?
A. I think it was in 1882.
Q. And from 1882 to 1889 you lived at Browns Valley?
A. Yes, sir.
Q. Was Wheaton just started when you moved there?
A. No, there was no Wheaton there at that time.
Q. When was the village of Wheaton established?
A. 1884.
Q. And when you moved to Wheaton about how old were you?
A. I was about twenty-one.
Q. In what business did you engage after your removal to Wheaton?

A. I was employed by my father in the Auditor's office. He was then county auditor of Traverse county.

Q. How long were you employed in the county auditor's office under your father?

1597 A. About six years.

Q. Did you succeed your father as county auditor of Traverse county?

A. Yes, sir.

Q. How long did you serve?

A. Until January, 1899.

Q. From the time of the beginning of your residence at Wheaton did you have occasion to observe the settlement and development of Traverse county?

A. Yes, to some extent.

Q. There has been referred to frequently in the testimony an area in the townships of Clifton and Redpath and extending northerly somewhat into Tintah township and somewhat easterly into Gorton township in Grant county, represented in light blue on Complainant's Exhibit No. 1, and described by the witness Ralph and in the complaint as the "delta zone." How soon after your residence at Wheaton began did you become acquainted with that portion of Traverse county?

A. Well, my real acquaintance with it began about the time that I was elected to the office of county auditor, and from that time on.

Q. How far is the Western limit of that area from Wheaton, approximately?

A. About six miles.

Q. Did you make a campaign for the office of county auditor in the year 1892?

A. No.

Q. You were elected without opposition?

A. Yes, sir.

Q. And the term of office, I believe is two years. Did you make a campaign in 1894?

A. No, I didn't.

1598 Q. And in 1896?

A. I believe I made a campaign in 1896.

Q. And 1898?

A. Yes, to some extent, I believe.

Q. So I take it, Mr. Rustad, that you had occasion to become quite thoroughly acquainted with the residents of Traverse county both in the towns and in the agricultural communities?

A. Yes. Of course my acquaintance with the residents was mostly made when they came to the office and I would meet the people there more than trips out in the country.

Q. Did you make some trips into the country to visit the people in their homes?

A. Yes, I have.

Q. And in this area that I have mentioned that is material here?

A. Yes, the portion of it that is located in Traverse county.

Q. What will you say as to the settlement, time of development, of this area, this so-called delta zone, as compared with other portions of Traverse county from the time that you became acquainted with it up to the year 1896?

A. It was the same as other portions of the country.

Q. What are the duties of the county auditor as to the taxing of lands within the county?

Mr. Bronson: Objected to as defining the laws. The laws tell us what the duties are and the court will take judicial notice of that.

Q. What are your general duties?

A. They are to meet with the assessors of the county and instruct them with respect to their duties in the listing of property.

1599 and after the assessments are made the books are returned to the auditor's office and he meets with the County Equalizing Board and reviews the assessments, and in case any property is omitted it is his duty to place it on the list and have it properly assessed, and after the assessments have been equalized he reports to the state Equalizing Board the assessments as they have been finally reviewed and determined by the County Board.

Q. Then he extends the tax levy, does he?

A. Yes, after the assessments have all been finally reviewed by the State Board and returned to the county auditor, he extends the taxes against all taxable property in the county.

Q. Does the auditor have occasion to become acquainted with the state of cultivation, the buildings and other improvements upon land?

A. Yes.

Q. Have you brought here the assessment books for the year 1896 in the towns of Clifton, Redpath and Tintah of Traverse county?

A. Yes.

Mr. Palmer: I will say to counsel for the complainant that these books contain a list of all the taxable property in Traverse county for the year 1896 in the three townships mentioned, and if it is the desire we will offer the books in evidence but with the consent of counsel that can be obviated by the witness reading into the record such portion of the tax books as is deemed material here, subject of course to the right of full cross-examination, and the reading into the record of all such portions as may be desired by counsel.

Q. I will ask a further question. Were those books made by you?

A. No, they were made by a clerk in the office under my supervision.

1600 Mr. Pinkney: Counsel for complainant are willing to obviate the necessity of putting the tax records into the record in this case by having the witness read into the record the numbers of privately owned land listed for taxation in the territory covered by the so-called delta zone in Traverse county for the year 1896, but counsel for the complainant object to the offer of the testimony as immaterial and not tending to prove any issue in this case.

Tax books marked Defendant's Exhibits 78, 78-A and 78-B for identification.

Q. Exhibit 78 is the assessment book for what township?
A. Clifton.
Q. And 78-A?
A. Redpath.
Q. And 78-B?
A. Tintah.
Q. And for the year 1896?
A. Yes sir.
Q. Do these books indicate whether the owners were residents upon the land or not?
A. No.
Q. Are you able from memory to state whether these owners were residents upon the land?
A. I am in most instances.
Q. I wish you would from these assessment books give the name of the owners of these lands in this so-called delta zone in the year 1896, a statement of whether the lands were improved by structures and also improved by cultivation, and, where you are able to do so, state whether such owners were residents upon the land or not, beginning with Exhibit 78, Clifton Township?

1601 Mr. Bronson: Objected to upon the ground that the assessment books as named are not in any event competent evidence, and are in the nature of hearsay evidence, and it is immaterial and not tending to prove any issues in this case.

Mr. Palmer: I understand that counsel do not urge the objection that the statement of the witness is not the best evidence.

Mr. Pinkney: We will accept the statement of the witness from the books without conceding that the books themselves constitute the best evidence of the facts read.

Mr. Bronson: Counsel for complainant would like to have him read into the record first what the books show without interspersing what the books show with oral testimony on it, for the purpose of understanding what is in the books and for the purpose of understanding what is not in the books and to what he is testifying personally.

A. Louis K. McClymonds, owner of North half and Southeast quarter of Southeast quarter of Section 2, 75 acres improved and also improved with structures.

Louis K. McClymonds, South half of Northeast quarter and Lots 1 and 2, Sections 2, 75 acres, improved. The McClymonds lands were occupied by Sylvester Johnson as manager of the farming operations in 1896.

Q. As I understand it now you are speaking about the year 1896 throughout this testimony?
A. Yes sir.

Peter Engstrom, owner of Southwest quarter of Section 2, 100 acres cultivated and improved by structures.

E. J. Erickson, owner of South half of Northeast quarter, and Lots 1, 2 of Section 4. 90 acres improved and also improved with structures.

1602 Q. Unless you state to the contrary are we to understand that the owners occupied these lands?

A. Yes sir.

Thos. O. Torgerson, owner and occupied by tenant—Southwest quarter of Section 4, 160 acres improved and farm buildings.

Sarah M. Hobbs, owner of all of Section 5; nearly all under cultivation. Owner occupied same together with her son-in-law J. K. Van Doran. This also improved with structures.

Charles Boetteher Lumber Co. owner Lots 9, 10, 13 and 14 of Section 6, occupied by tenant, eighty acres improved, also structures.

Mary E. Setterland owned Lots 6, 11, 12, Section 6, and occupied same. 102 acres cultivated, improved with structures.

Peter Erickson, owner and occupied Southeast quarter of Section 6, 110 acres under cultivation and improved with structures.

Carl Yarl, owner, Lots 3, 4, 7 and 8, Section 6, 139 acres under cultivation and improved with buildings.

Ferdinand Krenz, owner East half Section 7, occupied same, 270 acres under cultivation, and improved with farm buildings.

J. W. Reynolds, owner Northeast quarter Section 8, 30 acres under cultivation. He also owned Northwest of 8, of which 30 acres was under cultivation. Both tracts farmed by tenant.

Q. Structures?

A. No.

John Peter Asplund, occupied and owned Southeast quarter Section 8, 140 acres cultivated and improved with buildings.

1603 Edward Johnson Fortune, owned Southwest quarter of Section 8, of which 129 acres were cultivated, and it was improved with farm structures. Either occupied by himself or tenant.

William McClymonds, owned all of Section 11, 300 acres cultivated, and southeast quarter of section improved with farm structures. Occupied by his manager Sylvester Johnson.

William McClymonds owned East half and Southeast quarter of Northwest quarter, and north half of northwest quarter of Section 12 of which 120 acres were under cultivation.

Louis K. McClymonds owned all of Section 13, 140 acres under cultivation.

Olaf G. Olson owned Northwest quarter of Section 14, 88 acres of it was under cultivation and it was improved with structures.

Q. Did he live there?

A. He did but at one time he left the farm and attended school fitting himself for the ministry. It was either occupied by himself or a tenant.

Hannah Fortune owned and occupied southeast quarter of Section 14, 140 acres were cultivated and improved with farm structures. Her husband occupied the farm with her and his name was Oliver Fortune.

R. P. Wells, owned Southwest quarter of Section 14 of which all

was under cultivation and improved with farm structures. It was farmed and operated by a tenant.

John Compton owner Northeast quarter and East half of the Northwest quarter of Section 16 of which 140 acres were cultivated and operated by a tenant.

Axel Orgren owned West half of Northwest quarter of Section 16 of which 70 acres were cultivated and it was improved with
1604 farm structures.

Joseph Compton owned East half of Southeast quarter of Section 16; 30 acres cultivated, and improved with farm buildings. He occupied it.

David Compton, owner west half of Southeast quarter of Section 16, 20 acres under cultivation, not improved with farm structures.

Q. Did he live on it?

A. No.

Olaf J. Erickson owned Southwest quarter of Section 16 of which 60 acres were improved; no structures.

Mr. Bronson: We don't understand you to testify that where land is cultivated and has no buildings that there is a resident of the land living there?

A. No, but I say there are no buildings so it would show there was nobody living on it.

Q. We don't want the records to show, in reading from these books, that lands have residents on where they don't.

A. No sir.

By Mr. Palmer:

Q. Go ahead?

A. Charles M. Culbertson, owned South half of Section 17 of which 60 acres were under cultivation, but no structures. It was farmed by tenant.

Thos. O. Torgerson owned Southeast quarter of 18, 100 acres improved and also improved with buildings. Owned occupied same.

W. H. Wells owned all of Section 19, of which about 500 acres were under cultivation. Improved with buildings, but farmed and occupied by tenant.

Bartlett Ashbaugh owned Northeast quarter of 20 and occupied same. 150 acres cultivated, and it was improved with buildings.

John P. Olson owned Northeast quarter of Section 22 of
1605 which 110 acres were cultivated and it was also improved with farm structures. I don't remember whether he occupied it or a tenant.

E. D. Rogers, owned the Northwest quarter of 22, and the entire quarter was cultivated. It was improved with farm structures and occupied by himself. He still lives on the place.

William Maginn owned the Southeast quarter of Section 22, and occupied same; 150 acres cultivated; improved with buildings.

E. D. Rogers also owned Southwest quarter of 22 and cultivated the entire tract as part of the entire farm, consisting of the two quarters in that section.

A. A. Walker owned northwest quarter of Section 24 and occupied same with her husband and family. Entire quarter was cultivated and was improved with farm structures.

Rufus P. Wells owned southwest quarter of 24, 100 *miles* of it was cultivated, and farmed by tenant; no structures.

A. F. Kelly owned northeast quarter of 26; 150 acres was cultivated and farmed by tenant. Also improved with farm buildings.

Humphrey H. Smith owned northwest quarter and the southwest quarter of 26 and occupied same. 265 acres were under cultivation and improved with farm structures.

Winslow Holasick owned southeast quarter of 26, 80 acres of it was cultivated. No structures.

Andrew Peterson owned southeast quarter of Section 27; occupied either by himself or tenant; 60 acres of it was cultivated and it was improved with farm structures.

Ella G. Earsley owned northeast quarter section 28; all under cultivation, with structures. It was occupied by a tenant.

1606 Bartlett Ashbaugh, Northwest quarter of 28; farmed it himself; 120 acres was cultivated. It was improved with some structures.

Thos. F. O'Hare owned the southeast quarter of 28, 120 acres of it was cultivated, but it had no structures and it was farmed by a tenant.

C. W. Ward owned the southwest quarter of 28, 150 acres was cultivated and improved with farm structures. Occupied either by himself or a tenant.

J. F. Blaisdell owned all of section 29 and the entire section was under cultivation. Land occupied and farmed by tenant, northwest quarter was improved with farm buildings.

J. W. Reynolds owned south half of the southeast quarter of Section 30; 80 acres of it was cultivated; no buildings on the place. It was farmed by a tenant.

J. F. Blaisdell owned all of Section 31 and 800 acres was cultivated. It was improved with farm structures and farmed by a tenant. This section contains total acreage of 875.1 acres.

Christ Amundson owned and occupied the northeast quarter of 32; 140 acres cultivated and improved with farm buildings.

O. J. Hanson owned the southwest quarter of 32, and I believe farmed and occupied it himself. Whole quarter under cultivation, and it was improved with farm buildings.

William Burke, Jr., southeast of Section 32, 120 acres under cultivation, and improved with buildings; occupied, I believe by the owner.

J. Monson owned the southeast quarter of Section 34 and 100 acres of it was cultivated; it was improved with farm buildings and

1607 farmed by the owner.

Luke Rowan owned the northwest quarter of 34, all of which was cultivated; improved with farm structures; occupied by himself.

Herman Bevier, southeast quarter of Section 9, 150 acres cultivated; no structures. Farmed by the owner.

James Waters, southwest quarter of 9; all of it cultivated and farmed by the owner. Improved with farm structures.

Thos. O. Torgerson, northwest quarter of Sec. 15; entire quarter cultivated and improved with structures; occupied either by the owner or tenant.

Carl Wiberg, owned north half of southeast quarter of Section 15; eighty acres cultivated and improved with buildings. I believe the owner occupied it.

F. L. Mateson, north half of southwest quarter of 15; 80 acres improved. I don't know whether he occupied it or not; no structures.

Thos. Gillesby owned the south half of the southeast quarter of 15; 40 acres cultivated; no structures.

O. C. Eaton owned southwest quarter of 33, 75 acres cultivated, no farm structures, but farmed by a tenant.

Geo. A. Smith owned northwest quarter of 35, 80 acres cultivated, no structures, but farmed by owner or tenant.

Cyrus Wellington, owned all of Section 21; all improved and cultivated; also improved with structures; occupied by a tenant.

John Warran's heirs, northeast quarter Section 24, 50 acres cultivated; no structures.

Thos. Spain owned the southwest quarter of 34; entire quarter cultivated and improved with farm structures; occupied by owner.

1608 That completes the town of Clifton.

Q. I call your attention now to Assessment Book, Exhibit 78-A, the Town of Redpath and ask you to make the same statement from that?

A. Theodore Maybohn owns the south half of the northeast quarter and lots 1 and 2 of Section 2. No lands of that under cultivation, but it appears to have some structures.

John West, south half of northwest quarter and lots 3 and 4 of Section 2; 40 acres cultivated; improved with farm buildings. I am not certain whether the owner occupied it or not. It was occupied either by owner or tenant.

Anders Wiman owned the southwest quarter of 2 and occupied it; 40 acres cultivated, and improved with farm buildings.

Brita Erickson owned southeast quarter of Sec. 4; no lands cultivated, but it had some buildings on it, I don't think it was occupied.

Hans Blom owned the southwest of 4, 20 acres cultivated and improved with buildings, and owner occupied the place.

Erick F. Swanson owned the northeast quarter of Sec. 6, and I believe occupied it; 50 acres cultivated; improved with buildings.

James G. Johnson owned Lots 4, 5, 6 and 13, Section 6, either himself or tenant occupied it; 100 acres cultivated; buildings.

Christina Stromberg owned Lots 15, 16 and 17 of Section 6, and she and her husband occupied and farmed the place; 65 acres was under cultivation and it was improved with farm structures.

Andrew G. Holmstrom owned Lots 14, 18 and 19 of Section 6, 50 acres cultivated, but no structures. I believe it was farmed
1609 by the owner together with other lands that he owned.

Anders Lindquist, owned Lots 7, 8, 11 and 12, Section 6,

and occupied same; 120 acres cultivated, improved with buildings. John G. Appelgren, southeast quarter of Section 6, occupied it himself; 70 acres cultivated, improved with farm structures.

Frederick Neumann owned Lots 1, 6, 7, 8, 9, 10 and 11 and 12 of Section 7 and occupied it; 280 acres cultivated and improved with farm buildings.

John Forsberg owned Lots 2, 3, 4, and 5, Section 7, and I believe occupied it; 100 acres cultivated, but no structures.

Carl Krenz owned southeast quarter of Section 7, occupied and farmed it; 100 acres cultivated and improved with farm buildings.

A. A. Carlson owned southeast quarter of Section 8 and occupied it; 80 acres cultivated; and improved with farm buildings.

Carl Krenz also owned southwest quarter of Section 8; 50 acres under cultivation, and also improved with farm structures.

Mels O. Bror owned and occupied northeast quarter of Section 10; 40 acres of it was cultivated, and improved with farm buildings.

Olaf Olson owned southwest quarter of Section 10, and I believe occupied and farmed it; 40 acres was cultivated and it was improved with farm structures.

Nels O. Arskog owned and occupied southwest quarter of Sec. 12; either he or tenant occupied it; 120 acres was under cultivation and it was improved with farm buildings.

Austin F. Kelley owned northwest quarter and the south-
1610 west quarter of Section 12; 25 acres of the northwest quarter was under cultivation; improved with buildings and farmed by a tenant.

John H. Hanson owned the northwest quarter of Section 4 and occupied it, according to my best recollection; 35 acres of it was under cultivation, and it was improved with buildings.

Carl E. Schroeder, owned southeast quarter of Section 14; 12 acres under cultivation and it was improved with some farm buildings, and I believe occupied by the owner.

Johannes Jungberg, owned the southwest quarter of 14 and ten acres of it was cultivated. Improved with some buildings.

Walfred Hokanson owned the northeast quarter of Section 16 and farmed it; 90 acres cultivated, and improved with buildings.

Otto J. Engstrom owned and occupied the east half of the northeast quarter, and the northeast quarter of southwest quarter of Section 16.

Mr. Pinkney: You already had that northeast quarter occupied by somebody.

A. Well there is a mistake in the assessment book. He had 120 acres in Section 16, but just where it is located I can't state. 65 acres of it was under cultivation and it was improved with structures.

Amelia Almstrong owned and occupied, together with her husband, the west half of the northwest quarter of Section 16; 50 acres was cultivated; it was improved with farm buildings.

E. H. Bailey owned the north half of Section 17, 100 acres of which was cultivated, but it had no buildings and was farmed, I believe by a tenant.

Nils Nilson owned west half of southwest quarter of Section
1611 17 and farmed it; 58 acres was cultivated; no buildings.

Matilda Dahlstrom and her husband owned and occupied the northeast quarter of Section 18; 100 acres was cultivated and it was improved with farm buildings.

Anna M. Hokanson owned Lots 2, 3, 4 and 5, except one acre of Lot 2, in Section 18 which she farmed and of which 50 acres was cultivated and was improved with buildings.

Frederick C. Neumann, Lots 1, 6 and 7, Section 18, and I believe he farmed it himself. 40 acres of this tract was cultivated and there were some farm structures on it.

Carl M. Swenson owned Lot 12 of Section 18. 40 acres of this was cultivated and it was improved with structures, and I believe occupied by the owner.

Nils Nilson owned the southeast quarter of 18 and farmed it; 70 acres was cultivated and it was improved with farm buildings.

Heirs of Henry Hokanson owned Lots 7, 8, 10 and 11 of Section 18; 125 acres of this was cultivated and I believe farmed by members of the family; no structures.

E. D. Sewell owned the northeast quart- of Section 19, but it was farmed by a tenant; 50 acres was cultivated; no buildings.

Andrew Jackson owned Lot 10 of Section 19 and farmed it; 40 acres was cultivated, but no structures.

H. A. Hokanson owned the east half of the southeast quarter of Section 19, 20 acres of which was cultivated and farmed by the owner, but no structures.

Nils Nilson owned the northeast of the northeast, the southwest of the northeast, the northwest of the northeast and the southeast of the northeast, and the northeast of the southeast quart- of Section
20. 40 acres of this was cultivated and farmed by the owner.
1612 There were no buildings.

H. Adrian Hokanson owned the south half of the southwest and the west half of the southeast quarter, and the north half of the southwest quarter and the northwest quarter of Section 20; 275 acres of this was cultivated and farmed by the owner, and it was improved with farm buildings.

Louis F. Menage owned the northeast quarter of Section 25; the entire quarter was under cultivation and farmed by a tenant; no buildings.

The Second National Bank of Springfield, Mass., owned the west half of the northwest quarter of Section 25; 40 acres of this was cultivated and farmed by a tenant, but no buildings.

Louis F. Menage, the southwest quarter of 25; 80 acres of this was cultivated and it was improved with buildings and operated by a tenant.

Ole Olson owned the northeast quarter of 26 and farmed it; 90 acres cultivated and it was improved with farm buildings.

M. W. Nelson and E. O. Nelson owned the northwest quarter of 26 and farmed it; 28 acres cultivated, but no buildings.

Bengt Nelson owned the southeast quarter of 26 and farmed it and

115 acres was under cultivation; it was improved with structures and occupied by the owner.

J. Leonard Hokanson owned the southwest quarter of Section 26, and it was not farmed by him; 70 acres of it was cultivated and it has some farm buildings.

John Haarberg owned the southeast of 28 and occupied it, I believe. 95 acres was cultivated and it was improved with buildings.

William Nordeen owned the southwest of 28. It was improved with buildings but it doesn't appear to have been cultivated.

1613 although I know it was, but through my mistake the book doesn't show any cultivated lands there. I know he occupied it and farmed it.

W. F. Houston owned the northeast quarter of 29, but it was operated by a tenant, 40 acres cultivated and no buildings.

Andrew Jackson owned the northwest quarter of 29 occupied it and still lives on the farm, 129 acres under cultivation and improved with buildings.

William Resen owned the southeast quarter of 29 and occupied it; 70 acres was cultivated and it had farm buildings.

John Peterson owned the northeast quarter of 32 and farmed it. 110 acres was cultivated and it was improved with farm buildings.

Jos. B. Hodgson owned the northwest quarter of 32, but I don't believe it was occupied by him. It was farmed by a tenant, and 70 acres cultivated, no buildings.

Gustav Anderson owned the southeast quarter of Section 32 and occupied and farmed it; 92 acres was cultivated and it was improved with buildings.

Christian Nilson owned the northwest quarter of 34 and farmed it. 150 acres was cultivated and it was improved with buildings; occupied by the owner.

Martha A. Hqzard owned the south half of the southeast quarter of 34, but as I recollect it was farmed by a tenant; 64 acres cultivated but no buildings.

Carl L. Swanson, owned and occupied the southwest quarter of 34, and cultivated 120 acres. It was improved with buildings.

William Brown owned the northeast quarter of 36 and farmed it; 75 acres under cultivation, but no buildings.

1614 Alphina Brown owned the northwest quarter of 36, and I believe that quarter together with the other *were* farmed by the Brown Bros. 75 acres was under cultivation — this farm. It was improved with farm buildings.

Rosencranz Porter owned the southeast quarter of 36 and I believe occupied and farmed it; 120 acres under cultivation and improved with buildings.

Marian C. Porter owned southwest quarter of 36, but I have no recollection as to whether the owner or tenant occupied it. 60 acres was under cultivation, and it was improved with buildings.

J. G. Appelgren owned the southwest quarter of Section 5, 20 acres of which was under cultivation and was farmed by the owner. No buildings.

Hans Blom owned the northwest of the northeast quarter and the

northwest of the northwest quarter of Section 9, and 20 acres of these tracts were under cultivation, and farmed I believe by the owner, but there were no structures.

N. O. Araskog owned the northwest quarter of Section 13 and occupied it. 30 acres of it improved and cultivated, but there were no structures.

That is all of the Town of Redpath.

Q. Now, Exhibit 78-B, town of Tintah. Can you make a like statement from that?

A. H. B. Corey, northeast quarter of 36, farmed by tenant; 100 acres of this was improved and cultivated, but no buildings.

William E. Kelly, northeast quarter of 34. I am not certain as to whether he occupied it or whether a tenant did. 40 acres under cultivation and improved with buildings.

John Davidson owned and occupied the northwest quarter of 34; 70 acres under cultivation and improved with buildings.

1615 John B. Morrison owned the southwest quarter of Section 34, and it was improved with buildings, but no part of it was under cultivation.

John Ahlsten owned the northwest of the northeast quarter of Section 30 and farmed it. Ten acres of this was cultivated. No buildings.

Sven Nielson owned the east half of the northeast quarter and the southwest of the northeast quarter of Section 30, and farmed it. 85 acres of this was cultivated; improved with buildings.

Elizabeth Rosenberg owned Lot 1 of Section 30. 25 acres of it was cultivated and it was improved with buildings, but I am not certain as to whether the owner occupied it.

Robert H. Cross owned all of Section 29, and 370 acres of it was cultivated and farmed, I believe, by a tenant. The northeast quarter was improved with farm buildings.

John A. Davidson owned the southeast quarter of 26 and occupied and farmed it. 125 acres cultivated and it was improved with buildings.

John Johnson owned the southwest quarter of 26, and according to my best recollection occupied it. 110 acres of this quarter cultivated, and improved with buildings.

Charles H. Streeter owned and farmed the southwest quarter of 22, and 130 acres of this was cultivated and it was improved with buildings.

John A. McCulloch owned and occupied the southeast quarter of Section 22; 80 acres of that was cultivated and it was improved with buildings.

Ida M. Putnam and her husband owned and operated all of Section 21; 500 acres under cultivation; no buildings.

1616 John Ahlsten owned and occupied the southwest quarter of Section 20; 70 acres cultivated and improved with buildings.

James Denery owned and farmed and occupied the east half of Section 20, 150 acres of which was cultivated and the northeast of the section was improved with buildings.

James G. Johnson owned and farmed Lots 1, 2, 3 and 4 of Section 31; 131 acres cultivated, but no buildings.

Ole Olson owned the east half of the northwest quarter of 31 and farmed it; 80 acres of this under cultivation and it was improved with buildings.

Sven Nielsen, north half and the southeast quarter of Section 19 owned and occupied this, 25 acres cultivated. No buildings. That is all in the town of Tintah.

Q. In addition to the names of the occupants that you have mentioned and the lands you have described, do you recall whether there were additional lands within this so-called delta zone area occupied and cultivated in 1896?

A. Yes sir.

Q. Why are those parties not in this assessment book?

A. Because the lands were not taxable for the reason that they had not been patented. The United States patent had not been issued at that time to these homesteaders.

Q. Were those homesteaders so situated numerous or few?

A. There were not a great many of them, probably six or eight in each township.

Cross-examination.

By Mr. Bronson:

Q. You have been reading a list of names, Senator Rustad, from the assessment books of Traverse county for the year 1896 covering Clifton, Redpath and Tintah townships?

A. Yes sir.

1617 Q. And those books are books that have been preserved and kept in the office of the county auditor of Traverse county?

A. Yes.

Q. Are those books the original assessment books taken by the assessor?

A. Yes sir.

Q. Compiled by him and returned by him to the county board?

A. Yes sir.

Q. And it appears at that time that the assessor was Wm. Maginn in Clifton township?

A. Yes sir.

Q. You knew him?

A. Yes sir.

Q. Apparently on each of these assessment books there is a certificate attached by the assessor that it contains a full and correct list of all real and personal property subject to taxation in each of the townships?

A. Yes sir.

Q. And each of these assessment books contains the statement that the assessed value, set down in the proper column opposite the several descriptions of property, is in each case the true and full value of such property, to the best of my knowledge and belief?

A. Yes sir.

Q. You knew the certificate so reads and that it is signed by each of the assessors?

A. Yes sir.

Q. And from this assessment book, as I understand the town board first reviews?

A. Yes sir.

1618 Q. And then the county board reviews the assessment?

A. Yes.

Q. And then it proceeds to the state board?

A. Yes sir.

Q. All acting as Equalization Boards?

A. Yes sir.

Q. Now it appears that in this assessment book of Clifton township there is attached this certificate by William Maginn, assessor, for the year, I presume, 1895 and 1896. Was he assessor for those years?

A. Well, they elect assessors every year.

Q. As I understand it the taxes for 1896 are assessed in 1896 and are collected in 1897?

A. Yes sir.

Q. And to this book William Maginn made this certificate in the year 1896 when he turned it in to the county board?

A. Yes.

Q. And this book is the book turned in by the assessor with the certificate attached, except such changes as have been made in it on equalization?

A. Yes sir.

Q. Otherwise it is the assessor's proceedings under the law for the assessment of the land, with the equalization that follows from the Town Board, County and State Board?.

A. Yes sir.

Q. In other words, when the State Board equalizes it, it goes back and changes are made in this assessment as equalized?

A. By the state board; that is the auditor makes changes as directed by the State Board

Q. And you have read over this book and have given the

1619 equalized assessments made after the state board has acted upon them?

A. Yes sir. Well, I haven't made any figures.

Q. Well, such as you referred to?

A. Yes.

Q. Well, there appears in this book a tabular statement of real property assessments. Would it be correct to state that this book shows that the assessor for the year 1896 assessed number of acres improved 9,042.53 acres for Clifton township?

A. Well, it would be correct to say that that is the way he returned it. Whether it is correct or not, I don't know. I assumed it is correct of course. I haven't added his figures.

Q. Irrespective of the additions is this tabular statement of the real property for the assessment of the town of Clifton as shown on

Page 16 of this book the return made by the assessor of the number of acres improved and the number of acres unimproved and the value of the land and so forth?

A. Yes sir.

Q. As shown by this statement?

A. Yes sir.

Mr. Bronson: We will offer in evidence that portion of the book which the stenographer may copy into the record being the real property assessment for the year 1896 for the town of Clifton, as shown on Page 16, Assessment Book, marked Defendant's Exhibit 78, and the stenographer may copy into the record the tabular statement as shown there in place of the original.

Mr. Palmer: No objection, subject to explanation of the exhibit, however.

1620 *Tabular Statement of Real Property Assessment of the Town of Clifton, County of Traverse, Minn.*, 1896.

	No. of acres of land.	No. of acres improved.	No. of acres unimproved.	Value of land exclusive of structures and other improvements.	Value of improvements exclusive of structures.	Value of structures on lands or lots.	Assessed value of lands or lots including structures and improvements.	Total value as left by town brd. of review.
Footings brought forward from—	100th.		100th.	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.
Page 1.....	1,266.56	300	966.56	5,090.96	73	110	5,273.96	5,250.96
2.....	1,567 1	687	51,879.50	3,133.76	171.87	185	6,625.13	6,625.13
3.....	1,682 2	912	2,770	6,728.09	230.37	680	7,638.55	7,638.55
4.....	1,759	569	1,190	7,037	142.25	340	7,119.25	7,119.25
5.....	1,760	680	1,080	7,085	170	340	7,595	7,595
6.....	1,280	380	900	5,120	95	159	5,372	5,372
7.....	2,060.92	996	1,064.92	8,243.68	247.86	535	9,041.54	9,041.54
8.....	1,600	840	760	6,400	210	290	6,900	6,900
9.....	1,440	1,105	335	5,760	273.75	268	6,500.75	6,500.75
10.....	2,170.72	1,683	487.72	8,682	420.75	540	9,642.23	9,642.23
11.....	1,440	680	760	5,760.17	170	500	6,430	6,430
15.....	320	210	110	1,280	52.50	95	1,427.50	1,427.50
18.....	34,623	9,042.53	9,303.70	70,321.37	2,260.35	4040	79,542.91	79,542.91

Q. Now it appears also in this assessment book, a tabular
1621 statement of the personal property?

A. Yes sir.

Q. Is that such as returned by the assessor too?

A. Yes sir.

Q. And as modified by the county and state equalization boards?

A. Yes sir.

Q. Now without referring to the individual items all the way through, where is the total value as equalized, carried and shown?

A. On the bottom of the margin.

Q. And what is the total as shown from the tabular statement for the Township of Clifton for the year 1896?

A. $15,726.

Q. That includes the total personal property as assessed and equalized in the township of Clifton?

A. Yes sir.

Q. Now referring to the Township of Redpath, and the assessment book for that township for the year 1896, Defendant's Exhibit 78-A. I call your attention to what would be apparently page 21 of this assessment book as made out by the assessor?

A. Yes sir.

Q. And upon which the equalization proceedings were thereafter had, and ask you to state whether or not there is shown on such page a tabular statement of the real property assessment in the township of Redpath for the year 1896?

A. Yes sir.

Q. As returned by the assessor?

A. Yes sir.

Q. Which shows the number of acres improved and unimproved and the value of the structures and so forth?

A. Yes.

1622 Mr. Bronson: Complainant offers in evidence Page 21 being this tabular statement, and if counsel does not object the reporter may copy into the record such tabular statement, and it will be so offered as part of the cross-examination.

Mr. Palmer: No objection, but we shall of-er in evidence the revised tabular statement as made by the auditor after the equalization in both of these instances.

Q. I also call your attention to the Tabular Statement attached to the same book, Defendant's Exhibit 78-A, covering the personal property in the township of Redpath for the year 1896 and ask you to state what the total footings of values of personal property in such township, as equalized by the County Board, shows?

A. $18,877.

Q. There is also attached to this assessment book, Defendant's Exhibit 78-A a similar certificate by Gust Almstrong, assessor, as is attached to the book, Defendant's Exhibit 78, is there not?

A. Yes sir.

Q. Who is Edward Rustad?

A. That is myself.

	No. of acres of land.	Value of land exclusive of structures and other improvements.	Value of improvements exclusive of structures.
Footings brought forward from—	100th.	Dollars.	Dollars.
Page 1	....	5,974	
		5,431	20
2	....	6,406	
		5,823	211
3	....	5,698	
		5,180	77
4	....	5,174	
		4,704	88
5	....	4,571	
		4,155	88
6	....	4,083	
		3,712	105
7	....	3,696	
		3,360	66
8	....	5,940	
		5,400	96
9	....	5,554	
		5,049	109
10	....	7,346	
		6,678	172
11	....	6,668	
		6,080	174
12	....	6,688	
		6,080	131
	17,622.69	67,818	
		61,652	1,337
Contract—			
Page 13	....		903
Railroad lands—			
Page 14	....		40
15	....		127
	560		1,070

Value of structures on lands or lots.	Assessed value of lands or lots including structures and improvements.	Total value as left by the town board of review.	Total value as equalized by the county board.
Dollars.	Dollars.	Dollars.	Dollars.
215	5,546	5,546	6,209
95 800	6,389	6,389	7,417
355 440	5,452	5,452	6,215
195 428	4,982	4,982	5,690
190 326	4,363	4,388	4,985
145 248	3,907	3,927	4,436
110 135	3,486	3,486	3,897
60 360	5,656	5,656	6,396
160 428	5,184	5,348	6,091
190 833	7,180	7,220	8,351
370 484	6,469	6,469	7,346
215 338 150	6,361	6,361	7,157
5,035 2,235	64,975	65,224	74,190
	903	903	
	40	40	
	127	127	
	1,070	1,070	

Q. Apparently in both of these assessment books you took the acknowledgment and swore the assessor?

A. Yes sir.

Q. I call your attention to the assessment book of Tintah township, Defendant's Exhibit 78-B and page 20 thereof, a tabular statement of real property assessment for the township of Tintah in the year 1896, and ask you if that page shows the footings as returned by the assessor and as hereafter revised after equalization, covering the lands assessed in Tintah township?

(Here follows table marked page 1623.)

1624 A. Yes.

Q. This tabular statement appears to be revised at some places, does it not?

A. It is in places corrected and changed as reviewed and revised by the county board.

Mr. Bronson: Complainant offers in evidence likewise Page 20, being a tabular statement, of Defendant's Exhibit 78-B, and ask that the reporter copy same into the record the same as the other tabular statements heretofore described and mentioned.

Mr. Palmer: Same objection as heretofore noted.

Q. I show you a tabular statement of personal property as taxed in that township and ask you to state whether or not the same is as returned by the assessor and as revised by the Equalization Board?

A. Yes sir.

Q. And will you state the total value of personal property as equalized by the county board in that township for the year 1896 as shown on this tabular statement?

A. $15,637.

Q. This book, Defendant's Exhibit 78-B also has an Assessor's Return oath signed by Jno. Kaveney, which certificate is in the same form as in the other assessment books, and which the assessor swore to before you?

A. Yes sir.

Q. Now in this township of Clifton can you state the number of acres in the township?

A. Why I could figure it out.

Q. Is it a full congressional township with additions made on the westerly side?

A. Yes.

Q. Of six quarter sections additions?

(Here follows table marked page 1625.)

	No. of acres of land.	Value of land exclusive of structures and other improvements.	Value of improvements exclusive of structures.	Value of structures on lands or lots.
Footings brought forward from—	100th.	Dollars.		Dollars.
				408
Page 1.....	....	6,885	198	340
		8,665		132
2.....	....	8,588	97	110
		5,700	124	120
3.....	....	5,620	114	100
				354
4.....	....	5,976	223	295
		7,908		306
5.....	....	7,788	211	255
			112	384
6.....	....	4,780	102	320
		10,788		576
7.....	....	10,631	243	480
				552
8.....	....	7,592	78	460
			98	348
9.....	....	3,936	118	290
		7,055		370
10.....	....	7,040	128	400
				444
11.....	....	4,460	25	....
12.....	80	240	....	....
13.....	80	640	....	....
14.....	18,806.13	746.25		3,020
		146.25	1,537	3,624
15.....	....	240	....	1,060
		....		1,272
16.....		349	3	1,025
				2,085
		589	3	2,502

County of Traverse, Minn., 1896.

Assessed value of lands or lots including structures and improvements.	Total value as left by the town board of review.	Total value as equalized by the county board.
Dollars.	Dollars.	Dollars.
7,423	7,423	7,491
8,795	8,872	8,894
5,834	5,924	5,944
6,494	6,494	6,553
8,354	8,374	8,425
5,202	5,212	5,276
11,354	11,511	11,607
8,130	8,130	8,222
4,344	4,324	4,382
7,568	7,553	7,627
4,485	4,485	4,485
240	240	240
640	640	640
78,763	79,182	79,786
1,300	1,300	1,512
1,377	1,377	1,582
2,677	2,677	3,094

1626 A. Yes.

Q. Does this map of Clifton township show the additional acreage on the westerly side as well as the acreage through the township, generally speaking?

A. Yes.

Q. I will ask you to state whether or not there were not in Clifton township 24,364.53 acres, the total acreage in Clifton township?

Mr. Palmer: Objected to as the witness has not shown himself competent to testify and not cross-examination, not the best evidence.

Q. I show you Complainant's Exhibit 24, which is a map of Clifton township, out of a plat book for Traverse county. Have you seen that before, or something like that?

A. I have seen one like it.

Q. You are familiar with the plat book, are you?

A. Yes.

Q. I will ask you to state whether or not this Complainant's Exhibit 24 shows the fractional lots in Sections 1, 2, 3, 4, 5, 6, 7, 18, 19 and 31, as a part of that township?

Mr. Palmer: Objected to as not cross-examination and witness not shown himself competent to testify, and the Exhibit 24 has not been offered in evidence and cannot be received for the reason that it is not properly authenticated, no foundation laid for its introduction.

A. I believe it is.

Q. You have become familiar with the plats that have been made from time to time in that county?

A. Yes, sir.

Q. And familiar with the general location of the land?

A. Yes.

1627 Q And generally know about there being fractional lots in this township?

A. Yes, sir.

Q. And generally know about the fact of the township, some sections of the township having more than 640 acres?

A. Yes, sir.

Q. And would you say substantially that this complainant's Exhibit 24 represents the acreage in Clifton township?

Mr. Palmer: Objected to as not cross-examination, witness not shown himself competent to testify and no foundation laid, and Exhibit 24 not having been offered in evidence, *not* can it be received in evidence, nor is it competent to be received in evidence.

A. Yes.

Q. The total acreage, as I understand it, for Clifton township, would be secured by adding up the acreage in each section as disclosed by this Clifton township map?

Mr. Palmer: Objected to as not cross-examination, and Exhibit 24 not being in evidence and not being competent to be received in evidence, not properly authenticated and no foundation laid for its introduction.

A. I think so.

Q. Then by adding up these various sections shown on Clifton township and these sections on the northerly and westerly border thereof with the fractional lots shown, you would have the total acreage for Clifton township?

Mr. Palmer: Same objections as last above noted.

A. Yes.

Q. And that is the way you would compute it if you were to sit down and figure it now?

Mr. Palmer: Same objection.

A. I believe I could.

Q. Just like you read off the assessment books there
1628 the descriptions of the land and the amount of acres?

A. Yes, sir.

Q. You don't pretend to have measured it, when you read off the assessment books the description of land?

A. No.

Mr. Bronson: We offer in evidence Plaintiff's Exhibit 24 as part of the cross examination of the witness.

Mr. Palmer: Objected to as not part of the cross-examination, not properly authenticated, no foundation laid, incompetent, irrelevant and immaterial.

Q. Now will you state whether or not the total acreage of Redpath township is substantially the same as that in Clifton township?

Mr. Palmer: Same objection as last above noted.

A. About the same I would judge.

(Balance of cross-examination follows on next page.)

1629 Mr. Bronson:

Q. Mr. Rustad, Redpath township has additional fractional lots, substantially the same as Clifton township?

Mr. Palmer: Same objection as last above noted.

A. Yes, sir.

Mr. Bronson:

Q. Shown on Complainant's Exhibit #23?

Mr. Palmer: Same objection.

A. Yes, sir.

Mr. Bronson:

Q. And in computing the acreage for Redpath township from Complainant's Exhibit 23, how would you make the computation?

Mr. Palmer: That is objected to as not cross-examination for the reason that Exhibit 23 has not been offered in evidence nor is it competent to be received in evidence, not properly authenticated, no foundation laid.

A. The same as I would for Clifton township. If I was computing it I would use for Redpath the same method as I would use for Clifton township.

(Complainant's Exhibit 25 is marked.)

Mr. Bronson:

Q. I show you likewise Complainant's Exhibit 25, the map of Tintah township, and ask you to state whether or not this shows substantially the acreage in Tintah township?

Mr. Palmer: That is objected to as not cross-examination, Exhibit 25 not being offered in evidence nor could it be received in evidence, not competent to be received in evidence, not properly authenticated, no foundation laid, incompetent and immaterial.

A. I believe so.

Mr. Bronson:

Q. And likewise Complainant's Exhibit 23?

Mr. Palmer: Same objection.

1630 A. Yes, sir.

Mr. Bronson:

Q. In computing the acreage substantially in Tintah township, how would you make your computation of the total acreage?

Mr. Palmer: Same objection.

A. I would use the same method as for the other townships.

Mr. Bronson:

Q. Generally speaking, these Exhibits 23, 24 and 25, you have become familiar with covering the townships concerned, from time to time?

Mr. Palmer: Same objection.

A. Yes, sir.

Mr. Bronson:

Q. And have had occasion to use them from time to time?

Mr. Palmer: Same objection.

A. I have.

Mr. Bronson:

Q. In your duties as president of the bank or in your business. And these exhibits substantially represent, as far as you have ascertained, the acreage in each of the townships concerned?

Mr. Palmer: Same objection.

A. Yes, sir.

Mr. Bronson: We offer in evidence Complainant's Exhibit 25 as part of the cross-examination of the witness.

Mr. Palmer: Objected to as not part of the cross-examination not properly authenticated, no foundation laid and immaterial.

Mr. Bronson:

Q. If I were to ask you the question, Senator, now to compute the acreage for Tintah township and state to me what it was, and to compute the acreage for Redpath township and to state to me what it was, and to compute the acreage of Clifton township and state to me what it was, the aggregate for each township, would
1631 you so compute it from Complainant's Exhibits 23, 24 and 25 respectively?

Mr. Palmer: Same objection as last above noted, not cross-examination.

A. I think so.

Mr. Bronson:

Q. Now, Senator, you were in the Senate, weren't you, when this Chapter 138 of the Laws of 1911 was passed by the Legislature of the State of Minnesota?

Mr. Palmer: That is objected to as not cross-examination.

A. Yes.

Mr. Bronson:

Q. You have stated about being a resident up there in this district for a great number of years and having become somewhat familiar

in your various campaigns and residence there with this territory which we have described as the delta zone, and you have so, have you not?

A. Yes, sir.

Q. And if I understand you correctly, your familiarity with this district known as the delta zone and with this territory in Traverse county has extended over a period of 25 years, at least, last past?

A. Yes, sir.

Q. Before you were Senator you knew something about the construction of this first Mustinka state ditch, just generally speaking?

Mr. Palmer: That is objected to as not cross-examination.

A. Yes sir.

Mr. Bronson: And you knew something in a general way about the farmers in that community petitioning the Legislature for relief from the flood conditions that had existed or which they claimed to be existing in this delta zone and in other parts of Traverse County?

Mr. Palmer: Same objection.

1632 A. Yes.

Mr. Bronson: And you knew, did you, about the appointment of a committee by the Legislature of the State of Minnesota in the year 1909 to investigate those conditions?

Mr. Palmer: Same objection.

A. Yes sir .

Mr. Bronson:

Q. And were you present at any of the hearings?

A. I was.

Q. And heard the testimony——

Mr. Palmer: We would like it to appear of record in order to avoid the interposing of an objection to each specific question, that this line of questioning is objected to as not cross-examination and we shall take the position that in all such lines of inquiry the witness is the complainant's witness and that the complainant is bound by his testimony.

Mr. Bronson:

Q. You heard some of the testimony that was given?

A. I did.

Q. All of it?

A. No.

Q. I presume you were present at some of the meetings when the farmers were present?

A. Yes, sir.

Q. Were you instrumental somewhat in the petition that was pre-

sented to the legislature in presenting it, in behalf of your constituents up in your county?

A. I was to some extent.

Q. And you were interested somewhat in securing the relief for them?

A. Yes, as a resident of the county.

Q. And at that time you were a Senator?

A. No; in 1911?

1633 Q. 1909?

A. No.

Q. Your first service as Senator was in the Legislative session of 1911?

A. Yes sir.

Q. From your long residence there and acquaintance with conditions there when this committee heard the testimony of these farmers up there and when you came to the legislative session in 1911, did you not believe that the farmers in this district up there who had petitioned the legislature needed relief by the State of Minnesota from the conditions existing?

A. Yes.

Q. Did you not, in the legislative session of 1911, use your best efforts and endeavors to secure the passage of Chapter 138, Laws of 1911?

A. Yes, sir.

Q. I will ask you to state whether or not, Senator, on March 30, 1911, you did not move to amend House File #69, which subsequently was enacted into law and became known as Chapter 138, Laws of 1911, be inserting the following immediately preceding the enacting clause thereof, which in words and figures reads as follows:

"Whereas, A special committee consisting of five members of the House of Representatives of the legislative session of 1909, duly appointed under a resolution of said House duly adopted, and which authorized the appointment thereof for the purpose, and which was duly empowered to administer oaths and take the testimony of certain petitioners, seventeen in number, and others, in relation thereto, after taking such testimony, duly found and reported to said House that upwards of eight thousand acres of fertile farming lands in Traverse County, Minnesota, including the lands of the said

1634 petitioners, situated adjacent to the Mustinka River in said County—previously under cultivation for about thirty years, and during that time never overflowed—in the crop seasons of the years 1897 and 1908, were overflowed by the overflow of the said Mustinka River: that such overflows of the said lands of the said petitioners and others during the said years, destroyed crops of the said petitioners to the value of $28,302.00 and depreciated the value of the said lands overflowed, including the lands of the said petitioners, to an amount equal to the difference between forty dollars and fifteen dollars per acre; that the said overflows of the said river were occasioned by and resulted from the construction of the Mustinka State Ditch, which was constructed by the State of Minnesota, during the

years prior to 1896, but completed in said year, in order to drain lands situated in Grant County, Minnesota, then owned by the State of Minnesota, so as to make the said lands fertile, valuable and salable—and for no other purpose; that the overflow of the said Mustinka State Ditch is into the said Mustinka River, whose channel is inadequate to take care thereof; that such overflows of the said Mustinka River and of the lands adjacent thereto, including the lands of the said petitioners and others, are likely to continue unless and until the State of Minnesota constructs an adequate outlet for the surplus waters of the said Mustinka River, brought thereto as the result of the construction of the said Mustinka State Ditch; and that it is feasible to construct an adequate outlet for the waters of the said Mustinka Ditch or for the said surplus waters of the said Mustinka River, at a cost of about thirty-five thousand dollars."

Which amendments were adopted."

Mr. Palmer: Same objection and further objection that is is incompetent, immaterial and irrelevant.

A. Yes sir.

1635 Mr. Bronson:

Q. And you believed at that time that that was proper, just and right?

A. I believed, yes, it was.

Q. Afterwards, I will ask you to state whether or not, on March 30, 1911, House File #69, so amended by the amendment which you proposed and which was adopted, did not come up for third reading and final passage and that at such time the bill was passed in the Senate and you voted yea on the same?

Mr. Palmer: That is objected to as not cross-examination, not the best evidence, incompetent, immaterial and irrelevant.

A. Yes sir.

Mr. Bronson:

Q. I will also ask you to state whether or not, from your own recollection, Senator, this House File #69 as amended by the Senate by this amendment that you proposed and which was adopted, didn't then go back to the House for consideration as amended and if the House didn't then refuse to concur in such amendment and report was made back from the House to the Senate for their action, and that thereupon a conference committee was appointed from the House and from the Senate which considered House File #69 and that thereafter such conference committee reported back on April 6, 1911, to the House and Senate the following report, as shown on page 1061 of the Journal of the Senate for the year 1911, which in words and figures is as follows:

"Report of Conference Committee.

Hon. S. Y. Gordon, President of the Senate.

SIR:

We, the undersigned Committee on Conference, to whom was refered H. F. No. 69, A bill for an act to authorize the State Drainage Commission to construct an outlet for the waters of the Mus-
1636 tinka State Ditch in Traverse County, Minnesota, and to appropriate money therefor. Respectfully report and recommend as follows:

That the House recede from its refusal to concur in the Senate amendments and that the Senate recede from its amendments to said bill, and as a substitute for all amendments the Committee recommends the following:

Amend said House File by inserting the following immediately preceding the enacting clause thereof:

"Whereas, a special committee consisting of five members of the House of Representatives of the legislative session of the year 1909, duly appointed under the resolution of said House, duly adopted and which authorized the appointment thereof for the purpose and which was duly empowered to administer oaths and take the testimony of certain petitioners, seventeen in number, and others, in relation thereto, after taking such testimony duly found and reported to said House that upwards of eight thousand acres of fertile farming lands in Traverse County, Minnesota, including the lands of the said petitioners, situated adjacent to the Mustinka river, in said county—previously under cultivation for about thirty years and during that time never overflowed—in the crop seasons of the years 1897 and 1908, were overflowed by overflow of the said Mustinka river; that such overflows of the said lands of the said petitioners and others during the said years, destroyed crops of the said petitioners of the value of $28,302.00, and depreciated the value of the said lands overflowed, including the lands of the said petitioners, to an amount equal to the difference between forty dollars and fifteen dollars per acre; that the said overflows of the said river occasioned by and resulted from the construction of the Mustinka State Ditch, which was constructed by the State of Minnesota during the years prior to 1896, but completed in said year, in order to drain lands sit-
1637 uated in Grant County, Minnesota, then owned by the State of Minnesota, so as to make the said lands fertile, valuable and salable, and for no other purpose; that the overflow of the said Mustinka State Ditch is into the said Mustinka river, whose channel is inadequate to take care thereof; that such overflow of said Mustinka State Ditch and said Mustinka river have occurred each year since the construction of said ditch at times of rain or melting snow and will continue each year unless an adequate outlet for the surplus waters, brought to said Mustinka river as the result of the construction of said Mustinka State Ditch, is constructed; that the waters which overflow lands in the vicinity of

said Mustinka river collect in pools at various low places therein and become stagnant and a condition is thus created which is detrimental to the health of the people residing in the vicinity of the lands so overflowed and the same constitutes a menace to the public health and a public nuisance, in addition to being a private nuisance and injury to all persons owning lands overflowed thereby or residing in the vicinity of such overflowed lands that the nature of such injury and nuisance is such that if caused by the act of an individual could and would be abated by action of the courts and damages recovered therefor; that it is feasible to construct an adequate outlet for the waters of said Mustinka State Ditch or for the surplus waters of said Mustinka river so as to abate said nuisance and injury and so as to prevent injury to the health of the inhabitants of the vicinity of said ditch and said river and to promote public health, at a cost of about thirty-five thousand dollars ($35,000.00)."

And further amend by inserting after the word "county" in line 6 of section 1, the following:

"And in order to abate the public nuisance created by the overflow of waters from said Mustinka State Ditch and prevent in-
1638 jury to the health of the inhabitants of the vicinity of said ditch and said river and the lands overflowed by the waters thereof, and to promote public health."

The foregoing amendments refer to the original bill. And that, as so mended, said bill do pass.

EDWARD RUSTAD,
GEORGE H. SULLIVAN,
C. J. GUNDERSON,
Managers on the Part of the Senate.
LEWIS C. SPOONER,
THOMAS KNEELAND,
ALBERT PFAENDER,
Managers on the Part of the House.

Mr. Sullivan, G. H., moved that report of the Conference Committee on H. F. No. 69 be adopted.

Which motion prevailed."

Mr. Palmer: Same objection as last above noted, not the best evidence.

A. Yes.

Mr. Bronson:

Q. I will ask you to state whether or not, Senator, after the adoption of said conference report of the committee the bill wasn't thereafter amended in accordance with the conference report of the committee and was thereafter as *to* amended passed by the senate and the house and is now Chapter 138 of the Laws of 1911?

Mr. Palmer: Same objection as last above noted.

A. Yes, sir.

Redirect examination.

By Mr. Palmer:

Q. You stated that in this assessment book for the town of
1639 Clifton, being Defendant's Exhibit page 17 (which I understand will be copied by the reporter) is followed on page 18 by a revision of the figures after equalization by the several boards and as finally fixed, as the basis of taxation?

A. Yes.

Mr. Palmer: We offer in evidence and will ask to have copied into the record by the reporter, page 18 of Defendant's Exhibit 78.

Q. In this Exhibit 78*a*, being the assessment book for the town of Redpath for the year 1896, you stated that page 22 contains a tabular statement of the real property assessment as made and returned by the assessor, and which I understand will be copied into the record by the reporter. I will ask you if page 21 contains the revised tabular statement after action by the several boards of equalization and as finally fixed as the basis of taxation?

A. Yes sir.

Mr. Palmer: We offer then page 21 in evidence and ask that it be copied into the record by the reporter.

Q. Exhibit 78*b*, being the assessment book for the town of Tintah, I understand that pages 21 and 22 contain a tabular statement of real property for the year 1896 as made and returned by the assessor but upon this exhibit the assessor's figures have themselves been revised by you to correspond with the action taken by the several boards of equalization?

A. Yes.

Q. So that when that exhibit is copied into the record it will show the figures as finally fixed for the basis of taxation?

A. Yes, sir.

(Here follows table marked page 1640.)

Footings brought forward from—	No. of acres of land.	Value of land exclusive of structures and other improvements.
	100th.	Dollars.
Page 1	....	5,090
2	....	6,266
3	....	6,727
4	....	7,037
5	....	7,085
6	....	5,120
7	....	8,242
8	....	6,400
9	....	5,760
10	....	8,682
Deeded land on—		
Page 12	240	5,760
15	320	960 1,280
Total acres	18,586.23	74,409
Contract R. R. lands—		
Page 12	....	
" " 13	....	
" " 14	....	
	2929.68	9

Value of improvements exclusive of structures.	Value of structures on lands or lots.	Assessed value of lands or lots including structures and improvements.	Total value as equalized by the county board.
	Dollars.	Dollars.	Dollars.
	132		
	110	5,273	5,295
73	222		
	185	6,621	6,658
170	816		
	680	7,635	7,771
228	408		
	340	7,519	7,587
142	408		
	340	7,595	7,663
170	188		
	157	5,270	5,041
93	642		
	535	9,024	9,131
247	348		
	290	6,899	6,957
209	322		
	268	6,299	6,353
271	648		
	540	9,642	9,750
420			
	600		
631	500	6,430	6,530
170	98		
60	80	1,100	1,116
52	114		
	95	1,427	1,446
	4,944		
2305	4,120	80,834	81,658
	96		
1,929	80	2,009	2,025
2,305	300	2,305	2,305
1,976	250	2,226	2,276
	396		
6,210	330	6,580	6,606

1641	No. of acres of land.	No. of improved acres.	No. of acres unimproved.	Value of land exclusive of structures and other improvements.	Value of improvements exclusive of structures.	Value of structures on land or lots.	Assessed value of lands on lots including structures and improvements.
Footings brought forward from—	100th.	100th.	100th.	Dollars.	Dollars.	Dollars.	Dollars.
Page 1.....	....	80	584	2,515	20	95	5,556
2.....	....	855	735	5,818	211	335	4,789
3.....	....	210	810	5,320	77	195	5,452
4.....	....	357	723	4,804	88	190	4,982
5.....	....	358	440	4,155	88	145	2,363
6.....	....	425	535	3,712	105	110	3,907
7.....	....	275	165	3,360	66	60	3,486
8.....	....	70	90	600	11	5	616
9.....	....	334	416	4,889	109	120	5,164
10.....	....	695	385	4,846	172	370	7,180
11.....	....	607	313	5,780	174	215	6,469
12.....	....	514	366	5,980	131	150	6,161
13.....	....	80	80	575			506
14.....	....			40			40
15.....	160	130	130	120	7		127

Total Value as left by the Town Board of Review—Dollars.... 56,798

Q. You have stated that the certificate of the assessor states that he has valued the improvements at their full value. I ask
1642 you if, as a matter of fact, the assessors in the several townships and throughout your county did in fact list farm structures and improvements at full value?

Mr. Pinkney: We object to that, no proper foundation having been laid and incompetent and immaterial.

A. No.

Mr. Palmer:

Q. About what percentage of the actual value of these structures and improvements are the amounts given by those several assessors?

Mr. Pinkney: Same objection.

A. In my judgment about 10 per cent.

Mr. Palmer:

Q. And about what percentage of the actual value is the amounts returned here by the several assessors on these personal property assessments lists?

Mr. Pinkney: We object to that for the same reason, no foundation has been laid, incompetent and immaterial.

A. About one-third.

Recross-examination.

By Mr. Bronson:

Q. Senator, you think each of these assessors did not make a return of the true and full value of said property in accordance with his oath?

Mr. Palmer: That is objected to as argumentative, not redirect examination.

A. No, they did not.

(At this time recess was taken until 10 o'clock A. M., October 8, 1917.)

1643 October 8, 1917, at 10 o'clock a. m.

DANIEL M. TENNEY, being duly sworn in behalf of defendant, testified as follows:

Examined by Mr. Palmer:

Q. How old are you?
A. I am 73.

Q. Where were you born?
A. I was born at Stow, Massachusetts.
Q. The date of your birth?
A. July 3rd, 1844.
Q. Where do you reside?
A. I reside on Lake Traverse, township of Folsom, Traverse county, Minnesota.
Q. What is your occupation?
A. I have been farming since 1881. My occupation was, before I lost my feet, I was a blacksmith by trade.
Q. How did you lose your limbs, Mr. Tenney?
A. I got caught in a blizzard, got lost on the prairie.
Q. They were frozen?
A. One of them was froze pretty near off and the other one I save a part. I had it for about 25 years, just a part of my foot and an artificial foot.
Q. What year was that?
A. That was in the winter of 1872 and 1873.
Q. How long have you resided upon this land in Folsom township on which you say you have been farming?
A. Ever since 1881, February or March that I went there to live for good.
Q. You own the farm there on which you live?
A. Yes, sir.
Q. Will you kindly describe the land?
1644 A. Oh, I have got three fractions on the lake.
Q. Three fractional lots?
A. Three fractional lots on the lake in Section 2.
Q. What are those?
A. Lots 1, 2 and 3. Lot 1 is 7 acres, Lot 2 is 30-odd acres, Lot 3 is 49 acres. That is in Section 2 and in the same section I have a forty, the southeast forty of Section 2, and one forty in Section 11, the northeast forty of Section 11; that is the description of the land.
Q. How many acres?
A. 170.
Q. You took this farm as a homestead, did you?
A. Yes, sir.
Q. What year did you file on it?
A. I filed on it in 1877, I think; March 22nd, I think, in 1877.
Q. What year did you come west from Massachusetts?
A. In 1871.
Q. And from 1871 to 1881, before you moved permanently upon this land, were you in that locality, Mr. Tenney?
A. I was off and on, I wasn't there steady, of course. I first struck Browns Valley in the summer of 1872 and '3, that was the first time I saw the Valley but I didn't see the lake until that fall, I guess it was.
Q. And then you lived at Brown's Valley for a while?
A. I lived there one winter.
Q. Then where did you go?
A. I went to driving stage?

Q. Where did you drive stage?
A. I drove stage from Sisseton Agency to Ft. Sisseton.
Q. Sisseton Agency, is that the place where Sisseton, South Dakota, now is?
A. No, it ain't near there; well, it isn't very far from there
1645 but it is 6 or 8 miles.
Q. Which way?
A. The fort from the agency is right straight west—right straight east from the agency.
Q. What direction is Sisseton Agency from the present town of Sisseton, South Dakota?
A. I call it pretty near north.
Q. About how far do you say?
A. I don't know, I think it is 14 miles. I am not sure but I think that is about it.
Q. And Ft. Sisseton, you say, was straight west from the Sisseton Agency?
A. Yes, sir.
Q. About how far?
A. 28 miles.
Q. How long were you employed at this stage driving?
A. About three months.
Q. Then where did you go?
A. I went to work for the trading post man at the fort.
Q. At Ft. Sisseton?
A. Yes, sir.
Q. How long did you work there?
A. I worked about a week.
Q. Where did you go after you worked at the fort?
A. I went to the Agency.
Q. And what work did you do there?
A. I done the blacksmithing at the Agency.
Q. For how long?
A. About two years.
Q. Then where did you go?
A. I went out on my claim, that is, off and on; I wasn't
1646 there all the time steady, I went back east on a visit.
Q. Where was your claim?
A. My claim was this same claim on Lake Traverse.
Q. Now, after you moved onto this farm on Lake Traverse in Section 2, Folsom township, in February or March, 1881, did you observe Lake Traverse quite closely?
A. Well, I could throw stones from the house right out into the water. I watered my horses there; it was near the stable and I watered my horses there and I was down to the lake two or three times in a day during the summer but, of course, in the winter time I was not.
Q. Does your house still stand as it always stood, close to the lake bank?
A. Yes, sir, it still stands. We got a little lake shanty I bui-t

before I went there for keeps when I was working at the Agency and that still stands there.

Q. In the spring of 1881 did you have occasion to particularly observe the condition of Lake Traverse?

A. Yes, sir, I did.

Q. What was the occasion?

A. It was so much higher than it ever had been before. In going to the beach—I got the nicest beach at the lake and high water drowns it out and then there was a nice beach there, in the spring when the water got out I had no beach—and I thought it was the highest I would ever see it and I went to a stone and marked it. I took a cold chisel and a hammer, went down there when the water was still and I cut on the rock an arrow right into the stone and it is still there all right.

Q. About what date was it in the spring of 1881 that you cut this arrow?

A. As near as I can remember the 1st day of May.

Q. You say you cut this arrow in a rock?

1647 A. Yes sir.

Q. How large a rock is that, Mr. Tenney?

A. Well, I think it is about 5 feet high and I forget how wide it is. My son has got the dimensions of it.

Q. You mean it is about 5 feet high above the ground?

A. Yes, sir.

Q. Do you know how deep it is in the ground?

A. No, I do not.

Q. Has the rock ever moved?

A. Not that I know of. I don't think it was ever disturbed as near as I can tell.

Q. And what is the shape of the surface of the rock next to the water?

A. Straight up and down.

Q. It presents, as I understand you, a flat and vertical surface to the water's edge?

A. Yes, sir, right to the water's edge.

Q. And where was it that you chiseled this arrow on or about the 1st of May, 1881, with reference to the water's edge?

A. Right at the water's edge, the lake was perfectly still.

Q. Do I understand you, that the lake was perfectly calm and still?

A. Yes, sir.

Q. And you chiseled the arrow right at the edge of the water surface?

A. Yes, sir, right at the edge of the water.

Q. And did that arrow at that time accurately mark the height of the water surface?

A. Yes, certainly it did.

Q. And was this arrow which you chiseled there a dis-

1648 tinct mark on this boulder?

A. It is still.

Q. I say, was it a distinct mark?

A. Yes, sir, it is an arrow. I cut a perfect arrow, that is, as well as I could with a cold chisel, made a regular arrow right along on the edge of the water and put the point on.

Q. You say you are by profession a blacksmith?

A. Yes, sir, that is my trade.

Q. What is the character of this rock surface?

A. Well, it is—I don't know hardly what you call it. It ain't exactly a granite, but it is fully as hard as granite, it is an awful hard rock, all right.

Q. Why do you say that?

A. Well, by cutting it with a chisel, an ordinary cold chisel you cut iron with wouldn't phase it, it had to be hard like a stone cutter's chisel.

Q. You had to harden the cold chisel especially?

A. I had to harden the cold chisel same as you would if you worked on stone tools. It looks as much like a granite as anything but at the same time you wouldn't call it a granite.

Q. Now, Mr. Tenney, after 1881, tell us when you next observed the lake particularly high.

A. In 1897 it come up within about somewhere about between 6 and 7 inches I think, of my high water mark, the highest I ever seen it, anyway.

Mr. Pinkney: By the high water mark you mean the arrow point or the arrow?

A. It come up in 1897, it come up within 6 or 7 inches of the high water arrow.

Mr. Palmer:

Q. From Judge Pinkney's question I think perhaps you haven't made it plain whether you made this arrow horizontally on
1649 the rock.

A. It is horizontal and the arrow is somewhere between 6 and 8 inches long.

Q. And the arrow, you say, is horizontal across the rock?

A. Yes sir.

Q. So that the point of the arrow does not particularly mark the high water mark but the whole of the arrow?

A. Yes, sir, the whole of the arrow.

Q. Now, what time in the year 1897 did the lake attain this height of within about 6 or 7 inches of the high watermark which you made in 1881?

A. I couldn't give you the date of that but somewhere the last of April or first of May.

Q. Did you mark that height to which the water came up in the spring of 1897, Mr. Tenney?

A. Yes, sir, I marked it.

Q. How did you mark that?

A. I marked that with a cold chisel too, but I didn't put no arrow head on it, it was just a straight mark.

Q. Did you make it when the water was the highest, do you think, in 1897?

A. I think so, I calculated to, anyway.

Q. At the time you made this second mark you say, between 6 and 7 inches below the first one?

A. Yes, sir.

Q. Was the lake perfectly still and calm?

A. Yes, sir.

Q. And did that mark accurately record the elevation of the surface of the water at that time?

A. Yes; you mean, it was level with the mark?

Q. With that mark?

A. Yes, sir, certainly.

1650 Q. Mr. Tenney, how long in the spring of 1881 did the water stay up to this high water mark which you made?

A. It went down—I cut on the same rock down low where the water went down that fall, the lowest I saw it go down in the fall, I cut another straight mark across that. How much it fell from the 1881 top mark; my son has got it on a piece of paper, I guess, all written out so that it is perfectly plain.

Q. There was something that I guess we didn't understand, was it in the fall of 1881 that you made a mark showing the point to which the water fell?

A. Yes, sir, that is it.

Q. And that you say, is just a straight mark?

A. Yes, sir, that is quite a straight mark.

Q. Do you know about how far that was below the top mark?

A. No, but it was somewhere—my son has got it on a piece of paper, he measured it. I couldn't tell you, some 12 or 15 inches, I guess probably 15 would be nearer than 12 that it went down.

Q. Then, Mr. Tenney, we might speak of the top mark which you made in the spring of 1881 as mark #1?

A. Yes, sir.

Q. And the mark about 6 or 7 inches below that, which you made in the spring of 1897, as mark #2?

A. Yes, sir.

Q. And the mark which you made in the fall of 1881, to which you say the water fell that fall, as mark #3?

A. Yes.

Q. Now, about how long in the spring of 1881, if you observed it, did the water stay up to this mark #1?

A. I couldn't tell you exactly but it gradually com-

1651 menced to go down, you know, in a short time, it didn't stay there very long. I don't think it stayed there over two weeks that high but it gradually kept going down. You see, by watering my horses at the lake, don't you see, I saw that lake every day, you know, all through the summer, so that I could keep track of the beach in that way a good deal.

Q. And I suppose that you had that same occasion to observe it from time to time during all the time you have lived there?

A. Yes, I have always watered my horses in the summer time there because it was a handier place than any other to water them.

Q. How long if you observed it, did the water stay up to this mark #2 in the spring of 1897?

A. Well, as near as I can remember it acted just about the same as it did before. It gradually went down, commenced to go down kind of gradual and didn't stay up any great length of time.

Q. Between these years of 1881 and 1897, you saw the lake?

A. Well, it was just about medium, as near as I can remember, about the same as it is now; just what you call medium high.

Q. Did you observe any years in between from 1881 to 1897 when it was particularly low?

A. Yes, in 1891, and in 1892 it was very low.

Q. To what level did it fall during those years?

A. It fell down so that—there is an island right opposite my place, two-thirds or more across the lake, the island is. I went across there in a boat and I measured it probably eight or ten, perhaps a dozen different times along the—going across the lake. It is 2½ feet of water is all I could find and it didn't seem to
1652 vary two inches in depth from my house over to the island, perfectly level.

Q. That is, the bottom of the lake appears to be level?

A. Yes, sir, you could take an oar and give it a whirl and whirl it around it was that low. It whirled the water so it would come up muddy but I measured it repeatedly.

Q. How far is this island out into the lake from your shore?

A. I don't know, three-quarters of a mile, all right.

Q. And how far is it from that island over to the western shore?

A. It is about a quarter of a mile.

Q. What is the character of the lake bottom and the shores there as to being rocky?

A. There is rocks piled up along the lake shore in a good many places and there is beaches here and there, sand and gravel, at my place it is sand and gravel. Down at the next neighbor and the next it is about the same, and the second neighbor down a mile and a quarter, that is mostly sand comes up on that beach and the next one, next beach, is sand.

Q. How is it out in the lake as to rocky reefs?

A. I don't think there is any rocks in there.

Q. I mean, sticking up out of the water?

A. No, no rocks near me sticking out of the water. I guess there is no rocks in there, the boat runs up and down in there, you know, a boat 70 feet long runs up and down.

Q. Does the lake have at any other points rocky reefs?

A. Yes, sir, rocky reefs further down, a mile and a half further down, some rocky reefs in it.

Q. What is the nature of these islands, are they rocky?

1653 A. No, the islands are all right only around the island shore, the lake shore of it, it is rocky, you know, just boulders piled up; I don't know that there is any rocks on the islands, I don't remember seeing any.

Q. How many of those islands are there?

A. There is three.

Q. Do you recollect any other year between 1881 and 1897 that the lake was particularly high?

A. No.

Q. Do you recollect any year after 1897 when the lake was particularly low again?

A. No, I never seen it anything like it was before.

Q. When the lake was particularly low, when it went down a great deal?

A. I say I never saw it since that low water, after it come up in 1897 I never seen it vary very much since that, it has kept about so. It did get lower too, come to think about it, it got so low that down to Diamond where there is an elevator they had to dredge out to get a boat to the elevator but I didn't notice it over to my place, I heard about it.

Q. Do you remember what year that was?

A. No, I don't remember.

Q. Do you remember anything about how long ago it was?

A. I should think somewhere 5 or 6 years ago but I wouldn't say for sure.

Q. About 1911 or 1912, along in there?

A. Somewhere in there, I should judge.

1654 Cross-examination.

By Mr. Bronson:

Q. You say there are three islands in Lake Traverse?

A. Yes, sir.

Q. And you live opposite one island?

A. I live right opposite one.

Q. Where are the other two islands?

A. Down at the other end of the lake, pretty well down.

Q. That means north of you?

A. Means east, pretty near; the lake by my place runs pretty near east and west.

Q. How far are those islands up from the island that is opposite you?

A. I don't know, I never was up there but I should judge some four miles or five. I never was on the other two islands but I know there is two islands there.

Q. This high water in 1881 was in the spring of the year?

A. Yes, sir.

Q. And went off gradually?

A. Yes, sir.

Q. Soon after it got up to its height?

A. Yes, after it got up to its height I cut this arrow in the rock.

Q. Which way did the water go, north or south?

A. It was supposed to go north. Browns Valley is supposed to be in the divide, the Red river takes the water north and the Minnesota river south. The dividing line is there or watershed and Lake Traverse is supposed to go into the Bois de Sioux down into the Red river.

Q. Wait a minute, Mr. Tenney; I am just asking you
1655 whether you noticed how the water went in the spring of 1881, north or south?

A. I couldn't tell you that.

Q. How far is this farm of yours on the lake, how far up from the lower end of the lake where this Mustinka river empties into the lake, along the lake?

A. Somewhere about 18 or 20 miles. The lake itself is supposed to be 25 miles; I might be from the head of the lake about five miles and that would make it about 20 miles as near as I can tell you.

JAMES C. TENNEY, sworn in behalf of defendant, testified as follows.

Examined by Mr. Palmer:

Q. How old are you?

A. 35.

Q. Are you a son of Daniel M. Tenney, the witness last on the stand?

A. Yes, sir.

Q. Where were you born?

A. I was born on the farm on Lake Traverse described by him.

Q. What is the post office address both of yourself and your father?

A. Browns Valley, Minnesota.

Q. Give the date of your birth.

A. August 15, 1882.

Q. Where do you reside now?

A. I reside there on the homestead.

Q. How long have you resided there on the homestead?

A. All my life with the exception of about 7 years.

1656 Q. What years were those?

A. From 1904 until 1911.

Q. Otherwise have you resided with your father upon this homestead?

A. I have, yes.

Q. Are you married and do you have a family of your own?

A. Yes, sir.

Q. Who operates and carries on the farm?

A. I do.

Q. And for how long have you operated the farm?

A. Ever since 1912.

Q. Are you familiar with these arrow marks upon a certain boulder described by your father?

A. Yes, sir.

Q. What is your first recollection of these marks?

A. My first recollection of them is that on this rock there was a skull and cross-bones cut with a cold chisel and it used to interest me quite a lot when I was a child.

Q. Were those marks cut by your father on this rock also?

A. Yes, sir.

Q. What is your earliest recollection as to the water surface of Lake Traverse coming up to any one of these marks?

A. In 1897 was my recollection of its coming up to one of those marks because previous to that for several years it had been very low.

Q. And which of the marks were made that year?

A. Mark 2 was made in 1897.

Q. Did that record the level of the water surface that year?

A. Yes, sir, at that time it was made.

1657 Q. Can you give us about the time in 1897 that this mark 2 was made?

A. Yes, sir.

Q. When?

A. It was in April, I am quite positive, the last of April or first of May, I was quite positive it was in April. That is about the time the lake broke up that year.

Q. What is your first recollection of the water in Lake Traverse being particularly low?

A. Well, it must have been about 1891, 1892 or 1893, somewhere in there, because I remember going across the lake with my parents in a boat and the water was very, very shallow at that time.

Q. How did the water come up to this mark 2 in 1897, whether gradually through the years from 1893 and 1894?

A. Well, it came up a little after 1891, 1892 and 1893, it was then at the lowest but it came up a little between those years and 1897, a very little, I think.

Q. Can you say anything about the spring of 1896 as to the height of the water?

A. No, I couldn't say. I know it wasn't very high but I couldn't say just how high it was.

Q. Was there anything in the season of 1896 that particularly attracted your attention to the condition of the lake?

A. No, sir.

Q. After the year 1897 what was the first year that you observed, if at all, the water of the lake being particularly high?

A. Particularly high in 1915—1914.

Q. 1914, did you say?

A. Well, it wasn't as high in 1914 as it was in 1915

1658 but it was, what I would call particularly high in 1914.

Q. What part of 1914?

A. The latter part of 1914, that is, the latter part of the summer before the lake froze up, of course.

Q. The latter part of the summer of 1914?

A. Yes, sir.

Q. Will you state as near as you can, Mr. Tenney, the months in which you observed the rise of the lake in 1914?

A. In June, the latter part of June, or the first of July is when I noticed it.

Q. Did you notice particularly the amount of rainfall in the month of June, 1914?

A. Well, there was a lot of it in the month of June, also in the month- of May and July, if I remember right.

Q. What would you say as to the amount of rainfall in May, June and July, 1914, as compared with the ordinary?

A. It was greatly in excess of the ordinary.

Q. How high did the lake rise in this season of 1914 with reference to those marks?

A. I couldn't say as to that. I didn't observe it. I know it was up on the lake but just at what point I couldn't say.

Q. Now, in 1915, you say you observed it particularly high?

A. Yes, sir.

Q. At what time in 1915?

A. Well, it was the early part of the summer; it must have been along the first of June.

Q. When do you think was the highest water that season?

A. It didn't get any higher after it reached that point in June.

1659 Q. Now, did you observe the point attained by the water in 1915 with reference to any one of these marks?

A. Yes, sir.

Q. You may state.

A. It reached mark #2 early in the summer, I should say, as I said I think in June; I am not positive but I think the early part of June.

Q. That is mark #2, being the mark of the height of the water in the spring of 1897?

A. Yes, sir.

Q. Now, in this season of 1915, how long did it remain up to this mark #2?

A. Well it remained there all summer because it rained all the rest of the summer.

Q. Did it rise above mark #2?

A. No, sir.

Q. At no time that season?

A. At no time, no, sir.

Q. Did you observe particularly the rainfall beginning, say, about May, 1915, and extending on through the season?

A. Yes, sir.

Q. What would you say about that?

A. It was excessively heavy all through the summer.

Q. I want to go back a little, Mr. Tenney, and ask you if you observed and remember anything about the height of the water in the lake in the early spring of 1915?

A. You mean with regard to those marks?

Q. Well, with regard to the heighth of the water in the lake.

A. Well, the lake was very high.

Q. How was it in the late fall of 1914, at the time that it froze up?

A. In 1914?

1660 Q. Yes.

A. Well, it was quite high then but I don't know just how high it was in 1914.

Q. You have stated that in the late summer of 1914 you observed a considerable rise in the waters of the lake, as I understand you?
A. Yes, sir.
Q. I want to ask you whether you observed that condition to continue until the lake froze up that fall?
A. Yes sir, it did.
Q. So that in the early spring of 1915 you would say that the lake was unusually high?
A. Yes, sir, it was.
Q. Did you observe whether the lake stayed up to this mark #2 until the fall of 1915 at the time it froze up?
A. Not positively, but if it stopped raining for a week at any time, the lake always commences to go down from that mark. So it may have been at that mark and it may have been anywhere from there to 10 inches below that.

Mr. Pinkney:

Q. You don't know anything about that?
A. No, sir, I couldn't say as to that.

Mr. Palmer:

Q. The spring of 1916, did you observe particularly the condition of the lake?
A. Yes, sir, I did.
Q. You may state what you observed.
A. Why, I observed—I went down to look at the water mark before the ice went out in the spring because the water had melted and run in there and stood all over the ice, and I went down and looked at the water mark to see how it was on the rock, and it was then at the high water mark, the highest water mark or mark #1.
1661 Q. About what was the date that you observed it up to the high water mark or mark #1?
A. Well, it was about the 12th or 13th of April.
Q. 1916?
A. I think the 12th of April, 1916.
Q. How long did it remain at mark #1 at that time?
A. I don't know but I think about three days.
Q. Then did you observe about what point it fell?
A. Yes, sir.
Q. What point?
A. To mark 2.
Q. How long did it remain there?
A. Well, it remained there until along late in the summer or late in the fall of 1916, until it stopped raining.
Q. Did it at any time through the season of 1916——
A. I mean to say that it remained in that vicinity because if there isn't continual rainfall it won't stay at that mark at any time, it will go down about an inch a day, it drains off about that fast to a certain stage.
Q. That is, mark #2?

A. Yes, sir.

Q. Did you observe whether it again rose above mark #2 during the season of 1916?

A. No it did not.

Q. How about the level of the lake through the season of 1916 compared with that through the season of 1915, Mr. Tenney?

A. Well, it compared about the same until in the fall when it stopped raining, then it rapidly drained away about 22 inches because the lake goes down about an inch a day for about two weeks occasionally until it strikes a certain level.

1662 Q. What level is that?

A. Well, it is about 22 inches, between 22 and 24 inches below mark #2.

Q. And in this season of 1916, when was it that it fell?

A. In the fall.

Q. Did you observe particularly the rainfall through the season of 1916?

A. Yes, sir.

Q. How was it?

A. It was pretty heavy up until the—I don't know just what month it did stop raining but it was along after harvest.

Q. When do you usually harvest in that locality?

A. Oh, in August or September.

Q. How was the rainfall through that season compared with the ordinary?

A. Excessive.

Q. How would your recollection compare it with the rainfall through 1915?

A. About the same with the exception of the latter part of 1916.

Q. And through the latter part of 1916 would you say it was as heavy as through the latter part of 1915?

A. No, I believe not.

Q. Within your recollection how did the rainfall of 1914, 1915 and 1916 compare with any other years that you had known there?

A. They were greatly in excess of any other years that I know anything about.

Q. You mean in the matter of rainfall?

A. Yes, sir.

1663 Q. About what was the height of the water in the late fall of 1916 when it froze up, Mr. Tenney?

A. I think it was about 22 inches below the mark 2. I am not positive but that is just a guess on account of the lake going down so far and then stopping, below that mark 2, and as we had no rain I assume that it did stop at 22 inches.

Q. Would that be about the normal?

A. Yes, sir, that would be the normal, exactly normal.

Q. The spring of 1917, did you observe the height of the water in the lake?

A. Yes, sir.

Q. And where was it?

A. Well, it was about the same as it was in the fall, possibly a little higher, but not very much.

Mr. Bronson:

Q. What fall?
A. Fall of 1916.

Mr. Palmer:

Q. Did it rise during the spring of 1917?
A. No, sir.
Q. Do I understand then that it attained a height of about 22 inches below mark 2 in the spring of 1917?
A. I should judge so, yes, sir.
Q. About what height was it in the 1st of June, 1917?
A. I can't tell you exactly, I have got it on my paper (referring to paper), 22 inches below mark 2, June 1st.
Q. Did you take the depth of the water in the lake on June 1st, 1917?
A. I did, yes, sir.
Q. What was it?
A. It was 8 feet, about 8 feet; 8 feet 2 inches probably.
Q. Have you observed the height of the water in the lake just recently?
A. Yes.
1664 Q. What date?
A. October 5th.
Q. That would be Friday of last week?
A. Yes, sir.
Q. What was that height?

Mr. Pinkney: We object to that as incompetent and immaterial.

A. As compared to what?

Mr. Palmer:

Q. As compared to mark 2.
A. It was 41½ inches below mark 2.
Q. Have you made an accurate measurement of the distance between the several marks upon this rock?
A. Yes, sir, I have.
Q. What distance is mark 2 below mark 1?
A. 6½ inches.
Q. What distance is mark 3 below mark 2?
A. 10 inches.
Q. And the normal water level, as you observed it, is what distance below mark 3?
A. About 12 inches.
Q. I wish, Mr. Tenney, you would give, as well as you can, the size of this boulder on which these marks were made?
A. Well, it is such an irregular shape in every way except one, it

has got a perfectly flat face otherwise it is perfectly irregular and it would be pretty hard to give you the dimensions. But it is about 5 feet high, maybe 5½ at the highest point and about the same width and may — 3 to 4 feet thick.

Q. Do you know how deep it is embedded in the ground?

A. No, sir.

1665 Q. No way of ascertaining that?

A. No, sir, not without digging it out; as there is other rocks piled up against it, that would be difficult probably.

Q. What would you say as to the rock having moved or been changed in its position at all since you have known it?

A. I would say it was impossible.

Q. And this perfectly flat face that you speak of, is that the surface presented to the water?

A. Yes, sir.

Q. And on which the marks are made?

A. Yes, sir.

Q. This Traverse Lake, the portion of it southerly of where the Mustinka river comes in, I take it, that you know well?

A. Yes, quite well.

Q. Is that a true, permanent lake, Mr. Tenney?

A. Yes, sir.

Q. Is the water clear?

A. Well, sometimes it gets clear if the wind stops blowing long enough; ordinarily the wind doesn't stop long enough for it to get very clear. It has accumulated a good deal of mud the last years.

Q. There are elevators along the lake shore?

A. Yes, sir.

Q. How many?

A. Five.

Q. How many on the Minnesota side?

A. There is two on the Minnesota side and three on the Dakota side.

Q. And those are elevators at which grain is bought from the farmers, I take it?

1666 A. Yes, sir.

Q. And then how is it handled?

A. By boat.

Q. Barges?

A. Yes, sir.

Q. Tug boats or gasoline boats?

A. You may call it a tug boat. It looks like an old river packet but it answers the purpose of a tug boat.

Q. And the lake is used also for summer resort, pleasure resort?

A. Well, yes, more or less.

Q. Some cottages along the shore?

A. Yes, sir, there is.

Q. Both up towards Wheaton and down at Brown's Valley.

A. Yes, sir.

Q. Is there considerable fishing in the lake?

A. Yes, sir.

Q. Something has been said here, Mr. Tenney, about the water continuing to flow in this lake in the winter time.
A. I don't know anything about that, I am sure.
Q. Do you know whether it does or not?
A. No, sir, I do not.
Q. To what depth does the water usually freeze in that neighborhood?
A. You mean the depth of the ice?
Q. Yes, in the lake.
A. About three feet, usually, I think.

1667 Cross-examination.

By Mr. Bronson:

Q. That all depends on the amount of snow that falls and the climatic conditions?
A. Yes, sir; of course, it is different in different parts of the lake. On the shore where the snow accumulates it don't freeze so much.
Q. Do you remember this year of 1917 as being excessively dry?
A. Yes, sir, at least the latter part of it.
Q. And you saw water there 8 feet and 2 inches deep, just an approximate measurement?
A. In the middle of the lake, yes, sir, 1st of June.
Q. Now, I don't presume you have any specific recollections about the rainfall in 1897, being then a boy only 15 years old?
A. The lake didn't raise from any rainfall in 1897?
Q. Are you sure about that?
A. Yes, sir, positive.
Q. You are sure the lake wasn't up any in July, 1897?
A. Yes, it was up in July, it was up quite high but it was from the spring, melted snow in the winter. There was excessive snow in the winter of 1896-7.
Q. Have you any recollection now in the year 1897 of excessive rain in the month of May, 1897?
A. No, I haven't any recollection of it either way.
Q. Your father testified about the distance that you live south of where the Mustinka river empties into Lake Traverse; is that substantially correct?
A. I don't know, I am sure. I am not familiar with that end of the lake.
Q. I mean about the distance.
1668 A. No, not with the distance either.
Q. Where is the grain marketed that is taken in the elevators on that lake?
A. The elevator at the end of the lake nearest the Valley has a spur running out from the Valley and they shove their cars out there and load it at the end of the lake.
Q. Take it across the lake in barges to the elevator and from the elevator into the cars?

A. Yes, sir, Lakeside elevator, which is about a mile and a quarter from the Valley.

(At this time recess is taken until 1:30 o'clock, p. m., October 8, 1917).

1669 October 9, 1917.

Hearing resumed pursuant to adjournment with all parties present, 10 a. m.

EDWARD D. ROGERS, having been called as a witness on behalf of the defendant, was duly sworn and testified as follows:

Direct examination.

By Mr. Palmer:

Q. How old are you, Mr. Rogers?
A. Sixty-two.
Q. Where were you born?
A. Prescott, Wisconsin, down here on the river in '55.
Q. Where do you reside?
A. In the town of Clifton, Traverse County, Minnesota.
Q. Describe the land on which you live?
A. The northwest quarter of 22-127-45.
Q. Do you own this land?
A. Yes sir.
Q. Do you own other lands adjacent to it?
A. Yes sir.
Q. What land, Mr. Rogers?
A. South eighty in the southwest quarter of Section 15. My wife owns the other eighty in that quarter.
Q. Do you carry on and operate both of these quarter sections as one farm?
A. Yes sir.
Q. How long have you lived there?
A. With the exception of three years I have resided there since 1880.
Q. What three years were you away?
A. Well, I don't believe I know exactly, but it was in the neighborhood of 1902, 1903 and 1904.
1670 Q. When did you come to Minnesota from Wisconsin?
A. Well, I located on the claim there in the fall of 1879. I didn't move into the state until the spring of 1880.
Q. Did you take this northwest quarter of 22 as a homestead?
A. Yes sir.
Q. And the southwest of 15, did you buy that later?
A. I did.
Q. When did you become the owner of the southwest of 15?
A. Well, I don't know what year that could have been. I bought

that of the railroad company at $7.00 an acre on contract, and I was some years getting it paid for.

Q. When did you contract for it or about when?

A. Well, sometime after 1885. The land was worth $7.00 an acre at that time.

Q. Have you been farming and operating both of these quarter sections ever since the year 1880 with the exception of the three years you have mentioned?

A. Only part of it.

Q. What part?

A. Well, just what we happened to get plowed up. I commenced on the homestead and broke it up as fast as I could.

Q. And after you acquired the quarter in 15, I suppose you did the same with that, Mr. Rogers?

A. Yes, but it was later because at that time I had a tree claim in the southwest of 22 which I also broke up and cropped.

Q. When did you break up and crop the southwest of 22?

A. Well, I didn't look up these dates. I could have looked in my papers and found out. It was probably after 1885. I
1671 was four or five years getting one quarter broke up.

Q. Why was that?

A. Because I was poor and only had one pair of horses.

Q. Now when you came to this claim in 1880, Mr. Rogers, what was the condition in this section 15 and surrounding lands as to being wet or swampy?

A. Why, it was all farm land, all plow lands. We haven't anything what we call swamps. There is not a foot of swamps in the town of Clifton.

Q. Or has there ever been?

A. No, sir. There has been no place that you can't drive a team over any time. You can plow in those low places where the water is standing, but you can't plow in a swamp.

Q. Has that been the condition ever since you came there in 1880, Mr. Rogers, so far as the land is concerned?

A. It has sometimes been so wet we couldn't plow.

Q. What years do you recollect as being wet years—any in particular?

A. 1881 was *a* very wet in the spring, but we put our crops in. 1897 I think was one wet year in harvest time.

Q. Did you get a crop that year?

A. Yes, sir, got sixteen bushel of wheat to the acre that year—No. 1 wheat.

Q. Do you recall any other years?

A. Last year, 1916, was wet, 1915 and 1914 were also wet. 1914, 1915, 1916 were unusually wet.

Q. How did the year 1914, as to being wet, compare with the other years that you have known there?

A. Well, I think there was a little more rain perhaps than most of the years.

Q. Did you get a crop in 1914?

A. Two-thirds of a crop at least.

Q. Now 1915 you describe as a wet year. How was that
1672 compared with other years since you have been there?

A. Rather wet.

Q. Did you get a crop that year?

A. Yes sir.

Q. How much of a crop?

A. Anyway half a crop.

Q. What was the trouble in 1915 with the crop?

A. It rained too much.

Q. Did the water stand on your land?

A. In some places.

Q. Now, 1916, what can you say of that?

A. Well, we had no way of knowing how much water fell, but we thought it was the wettest season we ever saw there.

Q. And do you think it was the wettest season you ever saw since you came to the country?

A. I do, yes sir.

Q. Did you have a crop that year?

A. No sir.

Q. Did you have any crop at all?

A. I had twenty bushel of potatoes.

Q. Was that the only crop you had?

A. Hay crop. We always have a hay crop when it rains.

Q. You had some hay and twenty bushels of potatoes?

A. Yes sir, plenty of hay.

Q. Did you have any wheat?

A. No sir.

Q. Did you attempt to thresh at all in 1916?

A. No sir, didn't have a threshing machine on the place.

Q. Have any barley or oats or corn?

A. Didn't have any corn in and the barley was a total failure and so was the wheat from rust.

Q. What was the trouble?

1673 A. Rained too much without any dry weather.

Q. Now beginning in the early spring of 1916 tell us about the conditions there through the season?

A. It was fairly good until sometime towards the last of April. We put our wheat in in pretty good shape. Then it was so wet that we couldn't plow; being wet from the fall before, it didn't take but little rain to make it too wet.

Q. Now from the last of April on what was the condition as to rain?

A. All you wanted. Rained all the time we thought.

Q. Did the water stand on your land?

A. Yes sir, in some places.

Q. How did those three years of 1914, 1915 and 1916 compare as to rainfall and wetness on your land with other years you have known there?

A. They were extremely wet. I never kept track of how much water fell in any one season and haven't any way of knowing, but it seemed as if we didn't have any dry weather, any sunshine or any

wind to dry it up so there might not have been as much rain as one of those other years, still it was wetter because it didn't dry any.

Q. And take those three years, 1914, 1915 and 1916, do you recall any other period of three years like them in all your residence in that county?

A. No sir, nor in any one year like them.

Q. You mean in respect to the amount of rain?

A. Yes sir.

Q. It has been testified here, Mr. Rogers, that this Mustinka State Ditch and those other ditches in the town of Clifton drained those lands and made them dry in 1916, comparatively dry. Is that true?

Mr. Bronson: Objected to as an improper statement of *of*
1674 facts to the witness.

A. I expect those ditches take off some water, those in the town of Clifton. The Mustinka ditch has nothing to do with us; it is too far away.

Q. Did the Mustinka ditch ever at any time have any effect upon your land?

Mr. Bronson: Objected to as calling for an opinion and conclusion of the witness, without any foundation laid.

A. No sir.

Q. Do you recollect, Mr. Rogers, the time of the construction of the first section of this state ditch in 1896?

A. You have reference to the Mustinka ditch?

Q. Yes.

A. I had the impression it was constructed in 1894. Am I wrong?

Q. I think you are right as to the first part of it. As I understand the testimony, but the upper part in Grant County, it has been testified to here, was completed in 1896. At any rate you recollect the circumstance of it being constructed?

A. Yes sir.

Q. I want to ask you whether you observed on your lands any different condition after the construction of that ditch than before?

A. No sir.

Q. You recollect the construction of the second part of the last part of the Mustinka state ditch in the years 1913 and 1914, do you?

A. Yes sir.

Q. I want to ask you if you observed any different condition as respects your land after the construction of that last part of the ditch?

A. I did not.

1675 Q. I want to ask you as to the lands around your lands, your neighbor's lands whether you observed and different condition of their lands after the construction of any part of this state ditch?

A. I think they were just the same as mine.

Mr. Bronson: Move to strike it out as not responsive and mere opinion of the witness.

Q. What will you say as to the quantity of water upon your lands and the lands surrounding yours in the years 1914, 1915 and 1916 as compared with prior years, Mr. Rogers?

Mr. Bronson: Objected to as calling for a conclusion of the witness and not a statement of facts.

A. Well, I think we had more water, was my impression.

Mr. Bronson: Move to strike it out as not responsive to the question and mere conclusion.

Q. And is it your opinion from your knowledge of the lands and your residence there and your observation of them that there was more water stood upon them in those years than in prior years?

A. Why, there was some years that was wetter than 1914, but none wetter than 1915 and 1916.

Q. I want to ask you if there were any as wet in respect to water on your land as 1915 and 1916?

A. I don't think so.

Q. Can you recall any?

A. Why 1882 was pretty wet.

Q. You think that was as wet as 1916?

A. No, sir, I always raised a crop only in 1916.

Q. Now there is County Ditch No. 1 which apparently runs on the section line between sections 15 and 22?

A. Yes sir.

Q. And it was put in there about 1907 as indicated on the 1676 map here?

A. Yes sir.

Q. Has that been of benefit to your land?

A. Somewhat.

Q. In what way?

A. If we had a big heavy rain it would take some of the water off. At other times it was a detriment to the land.

Q. Why?

A. Because the road was so high and it dammed the water up and wouldn't let it get away.

Q. The surface water?

A. Yes sir.

Q. And kept it there on your land?

A. Yes sir.

Q. Now through 1915 and 1916 did that ditch benefit your land any?

A. Why, I can't say that it did. It drowned out one piece for me pretty near altogether in 1915 on the south side of the ditch. On the north side of the road it benefits a little, keeps the water from running on to that land.

Q. In 1916?

A. In 1916 it didn't make any difference. It simply rained too much, ditch or no ditch.

Q. What has been your observation of the effect of those other county ditches to the north of you running east and west?

A. Why I think they do some good, some seasons part of the time, but we are not getting the benefit from this drainage system in the town of Clifton we expected to get.

Q. Why?

A. Because we are trying to get all the water to run out of a twelve or twenty foot hole at the west end and it takes too
1677 long to do it. We are turning up dikes four and five feet high to hold the water and at my place it gets just as high as the top of the dike.

Q. Does the water stay on your land on account of these ditches?

A. It stays there until it runs out of that twelve or twenty foot gap at the west end.

Q. Is that true of the other ditches across the town of Clifton?

A. I suppose they are all alike.

Q. Has that been your observation?

A. Yes sir.

Q. I want you to compare the situation there now as to water standing on the land in such years as 1915 and 1916 to what it was before you had any ditches there at all?

A. It wasn't any better. The drainage at my place was just as good in the '80s as it is today.

Q. And how about the rest of the town of Clifton there?

A. I suppose they are all alike. I have one quarter on each side of ditch No. 1.

Mr. Bronson: Move to strike out the answer as stating a conclusion.

Q. I wish you would compare, Mr. Rogers, the run-off of surface waters from these lands now under present conditions with the time when these lands were practically prairie lands with prairie sod and prairie grass?

Mr. Pinkney: Objected to as incompetent and immaterial.

A. Well, I guess I pretty near answered that when I said I didn't think that the drainage was any better now than it was in the eighties.

1678 Q. Do you think the surface waters ran off just as fast from the lands when you had prairie sod and prairie grass?

A. Well, not quite, because of the fields being plowed up the water runs off faster than it does in the grass perhaps. There is these dead furrows and everything that lead the water down.

Q. There appears to be through this town of Clifton Twelve Mile creek and Five Mile creek?

—. ——.

A. You are familiar with those streams?

A. Yes sir.

Q. Were there in the early times before the lands were broken up to any great extent either ravines or runways, flow channels for the waters?

A. Why the water runs off in several law places. There are several of those places all over the town of Clifton that the water works into and it runs away into these creeks.

Q. These flow channels lead down to Twelve and Five Mile creeks?

A. To Twelve Mile creek mostly.

Q. And as I understand those are natural flow channels that the surface waters follow?

A. Yes sir.

Q. And are those natural flow channels still there as the lands are being cultivated or are they filled up more or less?

A. They are still there. Some places they might be filled up where a farmer hasn't tried to keep them open, plowed them full and let them wash full perhaps.

Q. You have lived within about two miles and a half of this Twelve Mile creek ever since you have been there?

A. Yes sir.

1679 Q. In the early days before any ditching was done what kind of a stream was that?

A. Well, it was a dry stream part of the year and in the spring of the year it was full of water.

Q. What was it as to its banks?

A. Why it has good banks on the west side. The west bank of Twelve Mile and the west bank of Five Mile I think don't overflow. Now I never got up on the west side of Twelve Mile creek when it was full of water to any extent to know whether it was running over or not, but the west bank of Five Mile doesn't overflow any in Clifton.

Q. Did you ever know of any overflow of Five Mile creek westerly over towards your lands or any of the lands there in the town of Clifton?

A. No, sir.

Q. Did you ever know of any overflow of Twelve Mile creek where it runs through the town of Clifton?

A. No, I don't from the fact that when it has been high water I never could get over there. I have always been shut in on an island there between the two creeks. I could get to Five Mile creek because the banks are high, but I couldn't get to the bank of Twelve Mile creek to know whether it was running over or not.

Q. Now do you know anything about whether Twelve Mile overflowed on its easterly bank in times of high water?

A. Well, you might call it an overflow where some of these streams run in; some of these low places that widen out and the water backs up, but the water don't run up into the country. It don't run up hill only just to fill up these bench lands.

Q. Now what times would this be that these low places as you say would fill up and back up?

1680 A. Well, it would only be in the time of flood.

Q. And that was generally in the spring of the year?

A. Yes, sir.

Q. How was that overflow as affecting your crops and the crops on the other lands in between the two creeks?

A. It didn't affect the crops in Clifton at all. Never any overflow there long enough for that on Twelve or Five Mile creek either.

Q. How about the lands adjoining Twelve Mile creek just to the east of it in the town of Clifton as to raising crops each year?

A. Why, that is the best land we have got unless it should be some on the west side of the creek in Clifton.

Q. Were crops raised there each year since you have been there, except 1916?

A. Well, they raised a crop there some in 1916.

Q. More than you did?

A. Yes, sir.

Q. And all other years since the early times what has been the condition there as to crop each year?

A. All the land that has been farmed along Twelve Mile creek they have raised a crop every year; from half to two-thirds of a crop anyhow.

Q. And how much of it has been farmed?

A. Well, I couldn't say as to that. There has been part of nearly every quarter farmed.

Q. How as to settlement since the beginning of the eighties when you came there?

A. Well, may be I can count them up in a few minutes, a few of them that was there when I came there. I should think there was probably a dozen.

Q. When you came in 1880?

1681 A. Yes, sir.

Q. That is in Clifton township?

A. Yes, sir.

Q. Can you mention some of their names?

A. Yes, sir. McClymonds and his son were there.

Q. What sections were they on?

A. Old man McClymonds was in 12 and his son William was in Section 2.

Q. Now on Section 12 did Mr. McClymonds have buildings?

A. Yes.

Q. What character of buildings?

A. They were right in the center of the section. His house was, holding one quarter as a homestead, and the barn was on another quarter.

Q. And what was his land in those days as to cultivation?

A. He had three or four hundred acres I should think.

Q. Under cultivation?

A. Yes, sir.

Q. That was back in 1880?

A. Yes, sir, I plowed there that fall for him by the acre.

Q. What was the condition of his lands as to being wet or dry?

A. It was dry.

Q. How about his crops those years?

A. I don't remember so much about the yield, but he had a fair crop. The land was weedy and he was a banker and not a farmer.

Q. What year was that?

A. That was in 1880. That was some time in the fall
1682 that I plowed there. I helped thresh at the same time I was there plowing.

Q. You say his son lived on Section 2?

A. Yes, sir.

Q. Did he have buildings there?

A. Yes, sir, house and barn.

Q. And in what condition was his land as to cultivation?

A. I don't know how much he could have had in crop, but he must have had in the neighborhood of fifty or sixty acres. It took him all fall to get it plowed.

Q. Now mention somebody else who was there in 1880?

A. John Erickson.

Q. What year did he come?

A. He might have been there in the fall of 1880.

Q. What section was he on?

A. In four.

Q. Did he have buildings there?

A. Yes, sir, living there yet, or his sons are. He died a short time ago.

Q. Did he have a crop that year?

A. I don't know as to 1880. I think he didn't put in a crop. I think he came that fall.

Q. 1881 did he have crops?

A. I don't know. He was there but I never was over to his place so I don't know what he put in at that time.

Q. Mention somebody else who settled in there about the time you did or was there when you came there?

A. Ed. Fortune.

Q. Where was he?

A. He was in the southwest of 8, I think.

Q. Did he have buildings there?

1683 A. Yes sir.

Q. How was his land as represents cultivation?

A. I don't know how much he had broke up into crop, but he had some crop and was holding it as a homestead?

Q. Did he continue to live there many years?

A. Yes sir, for a number of years.

Q. Can you mention anyone else?

A. John Asplund in the same section located there in 1882 and 1883, as early as that anyway.

Q. Did he have buildings?

A. Yes sir, he is there yet. Been there all the time.

Q. What kind of a farm -as he, good?

A. Good farm.

Q. Always been a good farm?

A. Yes sir.

Q. Mention someone else, Mr. Rogers?

A. Man by the name of Waters.

Q. Where did he live?
A. He had the southwest of 9.
Q. What year did he come?
A. I can't tell.
Q. Was he there when you came?
A. No sir. And there was a man in Section 4 by the name of Walters that was there when I came there.
Q. Did he have buildings?
A. Yes sir.
Q. Was he cultivating his lands?
A. Yes sir.
Q. What kind of a farm has he got?
A. It is a good quarter.
1684 Q. Has it always been a good quarter?
A. Yes sir.
Q. Now this land in 9?
A. He bought that land and only had it a short time. He put up a house and a barn.
Q. Who lives there now?
A. There doesn't anybody live there.
Q. Buildings on there?
A. Yes, but it is rented to someone nearby, I suppose. I don't know who is working it.
Q. What kind of farm land is that in Section 9?
A. It is about the same as the rest. It is all plow land in the town of Clifton. Ever- acre in every quarter is plow land if a man wants to plow it.
Q. And has it always been during the years you have been there?
A. Why you could always plow unless it rained too much the same as it does in any country. When it is too wet you can't plow.
Q. But so far as ordinary years, ordinary seasons, Mr. Rogers, has it always been true since you have been there that every acre in every quarter in the town of Clifton was tillable land?
A. Yes sir. If a man wanted to plow it he could plow every acre that he had.
Q. And would he raise a crop on it?
A. If it didn't get too wet.
Q. Well, take in ordinary years?
A. Ordinary years most all the time it has raised good crops, all of it.
Q. How has it been as compared with the other lands there in Traverse county and up around in Grant county and Wilkin
1685 county, and down in Bigstone county?
A. I don't think we have lost any more crops than the other fellows.
Q. Can you think of any other settlers there in the town of Clifton east of this Twelve Mile creek that were there when you came there or came shortly after?
A. Yes, there is a lot of them that came within three or four years. They kept coming right along and settling there. There was a man by the name of Andrew Johnson had one quarter in 14; a man by the name of Sargent had the southeast of 14. He was there when I

went there. There was a man by the name of Cater had the southwest quarter. He was there when I went there. Man by the name of Paul Walker in 24 was there. He is there yet. Man by the name of Webster in 26; another one by the name of George Cooper came there a few years after I did, in 26. Those two men were on the north half of 26. William Maginn was in the southeast quarter of 22; John Olson was in the northeast quarter of 22. Wiberg had the north eighty of the southeast of 15. There is a good many more if you want me to keep on. There is Bart Ashbaugh in 20, and D. W. Hixon in 23.

Q. I will not trouble you to give the specific names or the descriptions of the land, but how did the country in around you east of this Twelve Mile creek in the town of Clifton settle up as compared with the other parts of the county?

A. Well, I think there was some other parts of the county that settled up perhaps a little faster than we did.

Q. Why was that?

A. Because it was out along the lake and more rolling, perhaps.

Q. That would be over in the western part of the county?

A. Yes sir. But I haven't any way of knowing which
1686 settled up faster.

Q. Did they have towns nearer over there than you did?

A. Well, not much nearer. Part of them were a good deal farther away.

Q. What was the oldest town in the county?

A. Browns Valley.

Q. And do you remember when the town of Wheaton was founded?

A. Well, I don't remember just which year, but I was there when it was started.

Q. Was there any slower development of your section there, Mr. Rogers, on account of it being wetter than the other lands around it?

A. Well, I don't know how I would know whether it settled up any slower than some other part of the county.

Q. Did the settlement continue from time to time until the year 1896?

A. Yes sir.

Q. Has there been any more rapid settlement or development of your community since 1896 than there was before?

A. No sir, we had as much settlement before that, as many tax payers as we have now I think. One would have to enumerate them to know if there was any difference.

Q. Now did you become acquainted early with some of the lands easterly of you over in Grant county between your place and Norcross?

A. Yes sir, I went across there, part of that land, to Herman ever few weeks.

Q. What was your market place up to 1884?

A. Herman was the only market we had in the early days. We was a little nearer Herman on the east side than we are to
1687 Wheaton.

Q. Did you haul your grain to Herman?

A. Yes sir, mostly.
Q. Haul lumber for your buildings from there?
A. Yes sir.
Q. Have any trouble in getting across there to Herman?
A. Sometimes.
Q. When?
A. In the spring of the year when it would be too wet.
Q. Where was your trouble mainly, what part of the road?
A. It was over in the town of Logan.
Q. And how near to Herman?
A. Well it would be from up to within two miles of Herman to out about five miles.
Q. But ordinarily through the year what was the condition of the road over to Herman?
A. Well in the early day in the eighties we didn't have no road. We went right across the prairie. The condition of the road was the condition of the sod. On the west side of Five Mile creek we had a good tough sod, but after you got on the east side of Five Mile creek a half a mile to a mile there was lots of places where we didn't have any sod and we had to avoid those places. If we would get into them we were there.
Q. Stuck you mean?
A. Yes sir. There was no sod. It was sand-pockets.
Q. But westerly of Five Mile creek it was better?
A. Yes, because there was more grass, more sod, and you didn't find any sand.
1688 Q. Mr. Rogers, can you tell us anything about section 19 in Logan township?
A. Yes sir. We have been driving right across it and along the end of it for years.
Q. I will ask you particularly about the northwest portion of it?
A. Well that is near enough to Five Mile creek to be dry, rather drier than some other land.
Q. Has it always been so?
A. Yes sir, there is a high place or ridge there.
Q. Where is the wet land, if any, on that quarter?
A. There is not any on that quarter.
Q. On that section, I mean?
A. It is on the east half of the section, north and south.
Q. Well, how about the southeast corner?
A. Well, that is near the creek. The creek runs angling through that section.
Q. But you say the wet part is the east part of it?
A. The northeast part, yes sir, and part of the south.
Q. What about the settlement of that section?
A. Why, I think the west half of that has been farmed twenty or twenty-five years, or thirty years, I guess.
Q. Were there buildings on it thirty years ago?
A. Well, I can't say just when they were built, but they were built as soon as the man commenced to farm there.
Q. Who was the man?
A. His name was Flint.

Q. Have good buildings?

A. He never put up a house. He put up a barn and rented the quarter on the north side of the road and lived in that house.

1689 Q. What kind of a farm has it been?

A. Well, I supposed it was a good half section.

Q. Always considered it so?

A. Yes sir, he sold it for $30 an acre when the rest of us couldn't sell out at all.

Q. Now Section 18 on the north of that in the town of Logan. Can you tell us anything about that?

A. Yes, there is part of the southwest quarter and the northeast quarter are dry. The southeast is a little wet. It has been farmed all the time.

Q. Buildings on it?

A. Only on the southwest quarter.

Q. Who lived there?

A. This man Flint lived there, but not in the first place. There was a man by the name of Briggs homesteaded it and built the house.

Q. How far back was that settled?

A. Well, that man was there when I went there in the fall of 1879.

Q. What kind of farm land is that in 18?

A. It is all being farmed with the exception of little pieces in the northwest corner that they are cutting for hay.

Q. Has it always been in that same condition?

A. Why, whenever they wanted to farm it. The only reason it didn't get farmed was because the man had too much of his own to do some years and he let this go. He was renting it.

Q. How about 17 right east of that?

A. That is a hay section. That has never been broke up. Some speculators have always owned that.

Q. Any wet lands on that section?

A. Yes.

Q. Where is the wet land?

1690 A. It is on the south and southeast quarter. The northwest is fairly dry. A little ridge runs through there.

Q. Then it is the northwest portion that is dry and the southeast portion that is wet?

A. Yes sir.

Q. Now take section 7 of Logan, right north of 18?

A. Well, I don't know much about that section up in there any more than that they make hay there. Speculators got hold of some of this land and they have held it and never made any improvements on it. They have always sold the grass.

Q. How as to its being wet or dry?

A. I don't think there is any water there whatever, no more than the rest of the land around it.

Q. How about section 8 right east of that in the town of Logan?

A. Well, the south half of that is good and dry. Now about the north part I don't know.

Q. Settlement there early?

A. Yes sir, there is two sets of buildings there.
Q. How early was that settled up about?
A. The southeast quarter was settled in the early days but I can't tell you just when. It was settled sometime in the eighties though.
Q. What kind of farm land has it been?
A. Been pretty good corn land. Little too light, a little too sandy.
Q. Now can you say anything about section 6 over in the town of Logan, that would be right east of section 1 of your town?
A. I don't know what condition that is in. I don't know whether there is any buildings on it or not.
Q. Do you know as to its being wet or dry, Mr. Rogers?
1691 A. Well, I don't know as I know that either exactly. There is very little difference in the land. One quarter is about like the other in some localities there. Some of those quarters along the creek are a little better perhaps in regard to drainage than others.
Q. Do you know anything about section 4 of Logan?
A. No, that is too far away.
Q. Mr. Rogers, these ditches in your town run into Twelve Mile creek mostly?
A. Yes sir.
Q. In that Twelve Mile creek, so far as you have observed, a sufficient outlet for them?
A. A good outlet?
Q. Yes?
A. Yes sir.
Q. And some of them appear to run into Five Mile creek, over on the east side?
A. Some of them perhaps run across to Five Mile creek, start at Five Mile creek, but the water doesn't run out of the ditch into Five Mile creek only in the case where the ditch is on the east side of the creek, and we have got only one of those and that isn't finished. They are working at it.
Q. That is county ditch No. 42?
A. Yes sir, Ditch No. 1 didn't go to Five Mile creek. We didn't want to get the Five Mile creek water but we were within about eighty rods of the creek.
Q. How large a ditch is that No. 1?
A. Oh, it is Twelve feet on top and from three to five feet deep, about three feet up at the head, and it gradually grows deeper.
Q. I suppose you paid an assessment on that?
A. Yes sir.
1692 Q. How large an assessment, Mr. Rogers?
A. Oh, a couple hundred dollars.
Q. Has it been that much benefit to you?

Mr. Pinkney: Objected to as incompetent and immaterial.

A. Well, I said I paid that. I haven't paid it all yet.
Q. But your land is assessed for it?
A. Yes sir.
Q. I asked you whether it has been that much benefit to you?

A. Well, you are talking about the ditch?
Q. Yes.
A. If you will allow me to take the road into consideration, it has been, but without the road I would just as soon not have the ditch.
Q. That is, the material taken out of the ditch went to help the road?
A. Yes sir, to make the road. We put it right into the road.
Q. About what were the farm values of land in your community there in 1896?

Mr. Pinkney: Objected to as incompetent and immaterial.

A. Oh, I think about twenty dollars an acre.
Q. How did that compare with farm values of surrounding lands?
A. You mean through the town.
Q. Yes? Through towns right around yours?
A. I think that they are less perhaps because as you get nearer to the towns the prices increase.
Q. Why?
A. I suppose because it is closer to town.
1693 Q. Have your lands there been of any less value than the other lands are, on account of water?
A. Why, I don't think so. There is some difference on account of being farther from market.
Q. But take lands that were about the same distance from market as yours in 1896, how did yours compare in value with them?
A. Well, our land was worth just as much and a little more than land north and south of us.
Q. Why?
A. I don't know why, any more than that we were a little nearer to town perhaps on a direct road. The other fellows were farther away.
Q. How about the land east of you in Grant county. Was that worth any more than yours along in those years?
A. Why, I don't think so. Of course there may have been sales made sometimes for lots more than twenty dollars an acre.

Cross-examination.

By Mr. Bronson:

Q. Mr. Rogers, Clifton township, generally speaking, is good land?
A. I think so. I don't think there is any better soil in Traverse county.
Q. It was what might be termed prairie land?
A. Yes sir.
Q. Not rolling?
A. No sir.
Q. Sloping gradually to the north and northwest?
A. Yes sir.
Q. And as compared with the lands in Folsom and Windsor township- it is more flat?

1694 A. Yes sir.

Q. Now, generally speaking, your problem, apparently, in the years that you have lived in Clifton township, as far as you have had any problem, has been simply a question of the season as to the condition of rainfall. Outside of that you always were able to get a good crop?

A. I think we have had short crops on account of dry weather just as much as on account of wet.

Q. Now you mentioned the years 1914, 1915 and 1916, as being wet seasons, and the wet conditions that existed during those years served, as I understand you, to reduce the crop returns?

A. Yes sir.

Q. That is the lands in Clifton township those years were too wet to successfully raise a normal crop?

A. In 1914 we got a good crop. 1915 and 1916 were short.

Q. I understand you to testify on direct examination by Mr. Palmer that in 1914 you got a two-thirds crop?

A. Well, I call a two-thirds crop a good crop.

Q. And a three-thirds crop would be an excellent crop?

A. Yes.

Q. 1914 wasn't a wet season except in the fall?

A. That is all.

Q. Now would you say that the lands in Clifton township are as well drained or not as the lands in Folsom and Windsor townships?

A. I don't think it is as well drained.

Q. Counsel has asked you, Mr. Rogers, about some of these ditches that are in Clifton township?

A. Yes sir.

1695 Q. And one of these ditches runs between your two quarters?

A. Yes sir.

Q. And carries water from the east towards the west into Twelve Mile creek?

A. Yes sir.

Q. And you observed it carrying water, have you?

A. Yes sir.

Q. And counsel asked you whether it had benefitted your land, and I ask you whether or not you made any objection to the assessment?

A. I did not.

Q. Now this ditch serves to carry what waters, generally speaking, and coming from what direction, Mr. Rogers?

A. From the east to the west, about a mile or mile and a half south.

Q. And does it drain your land pretty well, excepting as you stated in direct examination, when there is an unusual or excessive condition of water so that the banks on the north side, I think you said, kind of keep it back?

A. When there is a flood on, it protects this north quarter. But when there is a flood on it floods the south quarter. So with me it is just about as broad as it is long. It does just about as much damage

as it does good; that is why I say I would just as soon not have the road and have the ditch to pay for. I would be just as well off.

Q. When there is a flood on it doesn't help one quarter any more than it hurts another quarter?

A. Yes sir.

Q. You mean the northwest of 22 when you say the south quarter?

A. In '15 it has drowned my barley all out here on this
1696 quarter.

Q. That is in the northwest of 22?

A. Yes sir. In a few days after the water ran off the barley looked like it was ripe.

Q. How was the ditch at that time as to water?

A. The ditch was full of water and backed up in the field.

Q. And the ditch overflooded did it?

A. The ditch always overflows when there is a flood on. It is as high as the road grade and runs over the road in three or four places.

Q. In both directions?

A. Runs everywhere, that is to the northwest.

Q. When the flood starts to come down does the ditch carry water?

A. Yes sir.

Q. And carry it off faster than without the ditch?

A. If we get a big rain it will run off because there is no water in the creek, but if the creek is full it backs clear up to my place.

Q. Sometimes then Twelve Mile creek is full clear up to its banks?

A. Yes sir, up to the bank on the east side.

Q. Most of these ditches as I understand, empty into Twelve Mile creek?

A. Yes sir. Here is a ditch when there is a flood on practically a mile and a half wide and it has to run out a gap down there about twenty-five or thirty feet.

Q. Where would the water be a mile and a half wide, that is about where?

A. When there is a flood on it is up against this bank here.
1697 Q. That is in 22?

A. Yes and 23.

Q. In Clifton township?

A. Yes sir.

Q. And about how long would it stay?

A. Well it would stay until it runs off.

Q. Maybe a week?

A. Yes sir.

Q. Ten days?

A. Sometimes, if it keeps raining.

Q. It all depends on the rain?

A. Yes sir.

Q. You never paid any particular attention to the cut-off state ditch, did you—that is, what we call the state ditch?

A. No sir, nothing more than I knew when it was dug and have been across it several times.

Q. Seen water in it have you?
A. Yes sir.
Q. Which way does this Twelve Mile creek flow?
A. Through the town of Clifton it is nearly in a northerly direction.
Q. And empties into what?
A. I suppose into the Mustinka river.
Q. Have you ever been up along that?
A. Yes sir.
Q. You have seen the Mustinka river have you?
A. Yes sir, been across it several times. I have been across it before there was any ditch there.
Q. How far are you from Herman?
A. Seven miles and a half from the edge of the village.
1698 Q. What was the condition, Mr. Rogers, of this ditch that goes by your farm in 1916 as to water?
A. Full of water part of the time.
Q. And in the spring was it overflooded, and ditch and the lands around it?
A. Why the lands right along the ditch were overflowed for about eighty rods back from the ditch.
Q. And was that in the spring?
A. That was in the spring.
Q. And in the summer too?
A. No, I don't think it got out of its banks in the summer, unless some of the very low places it went over.
Q. How was it in 1915?
A. Well, it got out of its banks in 1915.
Q. And spread over the land the same as it did in 1916?
A. Something the same, yes, sir.
Q. How long was it in 1916 that you think it was out of its banks.
A. Oh, I couldn't tell. It was so wet that we got tired of looking for dry weather. We gave up.
Q. Kept wet so long you didn't pay any particular attention?
A. No, we didn't have any dry days.
Q. Where did this water go that was there on the land?
A. Why, it soaked down and froze up in the fall, a good deal of it. The surplus went off.
Q. After a while in 1916 the flood condition on the land receded?
A. Yes sir.
Q. And went off by the ditch?
A. Yes sir.
Q. Into Twelve Mile creek?
1699 A. The surplus water.
Q. And the balance you say some of it froze up on the land?
A. No sir, we plowed all fall, but the ground was full of water.
Q. You did plow that fall of 1916?
A. Yes sir.
Q. And in the fall of 1915?

A. Yes, we plowed in 1915 or we would never had a chance to put in any crop in 1916.

Q. So these flood waters eventually in the years 1915 and 1916 went off, through this ditch as far as your lands were concerned, so you could plow,

A. Yes sir, dried up so we could plow.

Q. And were you over to Twelve Mile creek in 1915, as you recollect, where the ditch empties into it?

A. Why, I don't recollect any one time, but I certainly went to Wheaton in 1915, and I went right across the creek.

Q. I am just wondering whether you had any recollection or made any observation of whether Twelve Mile creek, when the waters were highest in the flooding stage, was backing up into the ditch or the ditch was emptying into Twelve Mile creek?

A. Well, I don't think I was along there when there was a flood in the creek. When the creek was high I don't remember of being there.

Q. Have you ever been at Norcross?

A. Yes sir.

Q. In the spring of the year any time?

A. No sir.

Q. Now you spoke about some of these lands in Logan township. Are they relatively about in the same condition as to having water on them as your lands are?

1700 A. Why most of them are, but one section there is rather drier, better located.

Q. That is on Section 19 that you first mentioned?

A. Yes sir.

Q. But the rest of them you would say comparatively are about the same as your land is with reference to the condition of being wet when it is wet?

A. Wet or dry.

Q. And sometimes in the spring when you go to Herman east of Five Mile creek you would have difficulty in getting through?

A. Well, that was in the early days when we didn't have any roads, when we went on the prairie where every man made his own road.

Q. You have no trouble in going to Herman now in the spring?

A. No sir.

Q. At no time?

A. No, any time.

Q. What road did you travel on going to Herman?

A. The state road.

Q. The road east and west out of Herman?

A. Yes sir.

Q. That is the state road which leads from Herman to Wheaton?

A. Yes sir.

Q. Is there a ditch along that road on the way to Herman?

A. Yes sir.

Q. Been in several years?

A. Yes.

Q. And where does that ditch—into what does that lead?
1701 A. It leads into a little run in the west side of 19. They didn't dig it into the creek.

Q. That is the ditch that goes from Herman westerly, County Ditch 8, with its branches as shown on this map, leads into a run, you say?

A. Yes sir. They stopped digging before *the* got to the creek.

Mr. Palmer: That would be County Ditch 8 in Grant County, wouldn't it?

Mr. Bronson: Yes.

Q. Now as I understand, Mr. Rogers, when you go to Herman you travel along this County Ditch No. 1?

A. Yes sir.

Q. Which ditch goes by your farm?

A. Yes sir.

Q. Then you cross Five Mile Creek?

A. Yes sir.

Q. And you cross another ditch that goes through Section 18 in Logan township?

A. Yes sir.

Q. Running south into County Ditch No. 8?

A. Yes sir.

Q. And then in Section 17 you meet County Ditch No. 8?

A. Yes sir.

Q. And that ditch No. 8 carries waters westerly, does it?

A. Yes sir.

Q. Into Five Mile creek?

A. Well, the ditch proper don't go to the creek. They turned it loose on the prairie, on the bench land.

Q. In Section 19?

1702 A. Yes sir, you see it don't go to the creek or to the county line, don't you.

Q. Yes, this map shows it to join the creek, however, but you say it don't go quite to the creek?

A. I said they didn't dig to the creek. There is a little run, a low place there.

Q. In Section 19, Logan township?

A. Yes sir. And this ain't just correct here. This should connect right pretty near on the line. The river ain't just in the right place. Instead of having that little curve in there this would come up to this other curve up near where it is on the line.

Q. That is near the westerly line of Section 19 where the river curves there about the middle portion it should come more straight across?

A. Yes, it should be a little closer to the county line, I think.

Q. The ditch or creek you mean?

A. Well, both of them.

Q. Now as you went along in the spring or in times of floods could you see this ditch full of water?

A. Yes sir.
Q. And carrying water westerly into the low place in Section 19?
A. Yes sir.
Q. Would it spread over the land there?
A. Not very much.
Q. Some?
A. Yes, some because there is a table of bench land all along that creek that they dumped this water on.
Q. Then sometimes as you went to Herman at different times after this ditch was constructed would you see the ditch
1703 overflowed or out of its banks, or any water over the lands to the north?
A. Yes.
Q. And the same to the south?
A. I don't think so. The ditch is on the north side of the road here. Here is where I saw the water run over.
Q. Section 17?
A. Right over here, and right down here across a man's plowing.
Q. That is in Logan township, Section 17, southwasterly towards Five Mile creek?
A. Yes sir.
Q. You have seen it go across there?
A. Yes sir.
Q. When?
A. That was in the spring of 1915.
Q. Have you got a high roadway leading into Herman?
A. Yes sir.
Q. And that grade stays above water, does it?
A. Yes sir, this water here ran under the grade under the bridge, and then left it right there.
Q. Left the ditch you mean?
A. Left this graded ditch. There is somewhat of a ditch here that has been made with a grader.
Q. That is the road going into Herman has a grade?
A. Yes sir, and this little ditch is graded with the grading machine.
Q. The county ditch is dredged with a dredge?
A. Yes sir. And this one is only worked up with a grader, and after the water crosses under the bridge it left the ditch and went right down across that man's plowing there.
Q. How long did you see that water there in 1915?
1704 A. Well, I didn't see it there but once because I didn't go to town by there but once while it was up over there.
Q. Didn't you have occasion to go?
A. No sir. I saw it leave the ditch here.
Q. That is in Section 14 near Herman?
A. And take that old river bed around there.
Q. That is north of the ditch?
A. Yes sir, because that was full of snow and ice and it wasn't full here and it came this way through there.
Q. What time of the year was that?

A. In the spring of the year.
Q. Of 1915?
A. Yes sir.
Q. And then just east of Five Mile creek when you cross the ridge there is a bridge there?
A. Yes sir, just across the ditch.
Q. And have you seen some of the lands right east of Five Mile creek just as you crossed the road there to the north in 1915 and 1916 with some waters on them?
A. No water that went out of the ditch it don't run on to the north side of the road.
Q. Did you see any waters there outside of the banks of Five Mile creek in section 13 on the east side as you went along this road east to Herman?
A. No, this don't overflow here.
Q. Five Mile creek east doesn't overflow there?
A. I don't think so.
Q. Not even in high water?
A. I don't think so, not in that section anyway.
Q. Does it down here in Section 24?
A. No sir.
Q. East of there?
A. Nothing only the bench lands.
1705 Q. Or down here in section 19 on the east side?
A. There is a little low place where it overflows. That low place is the bench land, and they didn't dig there because they couldn't dig into the town of Clifton and they dug as far as they dared and turned it loose on to us.
Q. Turned the water loose on to you?
A. Yes sir.
Q. Did it make some flood there?
A. No sir, the creek has been able to carry all the water they put in there. I don't know how far up though, because the creek flattens out as it goes north. The banks are not as prominent as they are here.
Q. You are not affected—your lands, with the water of Five Mile creek?
A. No sir, not a bit. That is one reason why we located there. We thought the town of Clifton was well drained with a creek on each side of it, and we still think so.
Q. You have seen all these ditches go in there since you have lived up there?
A. Yes sir.
Q. And that has been within the last ten years approximately?
A. In the neighborhood of that. I think the Mustinka ditch was commenced before that though.
Q. Did you come down to the Legislature in 1909 and 1910?
A. I never did, sir.
Q. You were among those farmers who came down here asking to get some relief from wet conditions up there?
A. No sir.

Q. You mentioned a minute ago about some ditch they are trying to put in now. What ditch is that?

A. That is No. 5.

1706 Q. Where would that go?

Mr. Palmer: Objected to as entirely immaterial?

—. Well, that would be on my south line, a half a mile south from that ditch there—on the quarter line. It is to connect with this ditch.

Q. You mean to connect with this county ditch you have been talking about in Logan township?

A. Yes sir. It has already been connected. They want to drain these lakes up here in Logan.

Q. Has there been a petition for this ditch?

A. Sure thing.

Q. And has it been located?

A. Yes sir.

Q. Part of it dug?

A. No sir.

Q. Where was it going to run, from where to where?

A. Oh, I can't locate it.

Q. Does it run from the end of this County ditch 8 west into Twelve Mile creek?

A. I would suppose it would run the other way. If you commence up here the water flows down, but I suppose that commenced at this end. But it is already connected with that ditch there.

Q. The petitions or proceedings to connect it—it hasn't been connected yet.

A. If it hasn't been there has been another ditch laid on top of that one. I can't tell you which.

Q. Is there a ditch leading westerly from the end of county ditch 8?

A. No, there is not any ditch been dug, but there has been a petition out.

Q. And that would run on your quarter line, on the

1707 northwest of 22?

A. It would run on the quarter line of 22, yes sir.

Q. What has been the effect of these ditches as you have observed them generally speaking, these ditches you have got here, 1, 2, 3 and 4 north of Section 22?

A. Well, I don't know much of anything about any of them only this has only been dug a year, and this one they are trying to finish it now, and that one is quite a ways off and I never was there when there was water in there.

Q. And these last three ditches, except the one that goes by your farm, are a mile, two miles and three miles north of you?

A. Yes sir.

Q. All running west into Twelve Mile creek?

A. Yes sir.

(Adjournment taken until 2 p. m.)

1708 October 9, 1917, at 1:45 p. m. o'clock.

MARTIN MONSON, sworn in behalf of defendant, testified as follows:.

Examined by Mr. Palmer:

Q. How old are you?
A. 53 years old.
Q. Where were you born?
A. Norway.
Q. What age did you come to this country?
A. I was 16 years old, coming 17. I come over here in May and I was 17 that fall, in August.
Q. Where do you live?
A. I live in the town of Clifton, Traverse county, Minnesota.
Q. How long have you lived in Traverse county?
A. I come there in the spring of 1884.
Q. How long have you lived in Clifton township?
A. I come in Clifton township the 6th day of April, 1884, and been there ever since.
Q. Where did you settle?
A. I was working out for three or four years and then I got to farming myself.
Q. On what sections did you work?
A. I had a quarter on the northwest quarter of 32, tree claim.
Q. When did you file on that tree claim, the northwest of 32?
A. 1890, in the fall.
Q. When did you set out trees there?
A. The next spring, 1891.
Q. When you came in 1884, between that and 1890 what did you do, Mr. Monson?
A. I was working out on a farm there and then I rented some land there, from 1888 and on, 1889.
Q. On what farm did you work from 1884 to 1888?
1709 A. I worked on Section 31 in the town of Clifton.
Q. Which part of the section?
A. That is——
Q. East of the river or west?
A. East of the river, the buildings are east of the river, but there was a whole section there and the river goes straight through it.
Q. By river you mean Twelve Mile creek?
A. Yes, sir.
Q. Whom did you fork for there?
A. I don't know whether it was William Tripp or Dave Tripp, they were partners. Dave is the one, I think, had all the way, he was the one that hired me, anyhow.
Q. And what land did they farm there?
A. They worked Section 31 in the town of Clifton.
Q. All of Section 31?
A. Yes, sir.

Q. You worked there from 1884 to 1888; what kind of buildings did they have on the east part of that section?
A. A good house, a good barn, had good buildings.
Q. How was their land as to cultivation?
A. It was all under cultivation.
Q. What was the quality of the crops?
A. They had good crops. 1885 and 1886 they had good big crops.
Q. How were their lands as to water?
A. Water didn't bother any.
Q. What lands did you rent after 1888?
1710 A. I rented a piece of land in the town of Dollymount, that is south of there, in 1889.
Q. How far south of Section 32 was the land which you rented in 1889?
A. Two miles.
Q. What years did you farm this land in Dollymount?
A. Just in 1889.
Q. Did you build buildings after 1890 on this northwest of 32?
A. No, I did not.
Q. Did you farm the land?
A. Yes, sir.
Q. Where did you live while you were farming that land?
A. I used to board with a fellow right south of me in the same section.
Q. What part did he own?
A. He owned the southwest quarter of 32.
Q. What was his name?
A. Name was Hanson.
Q. Was he farming the southwest of 32 then?
A. Yes, sir.
Q. Have buildings there?
A. Yes, sir, we were batching it together.
Q. Anybody else live on 32 then in 1890?
A. Yes, sir, a fellow by the name of Christ Amundson.
Q. Where did he live?
A. He lived on the northeast of 32.
Q. What kind of buildings did he have?
A. Well, he had pretty fair buildings; the barn wasn't there then but he built the barn in 1896, I think.
Q. Anybody else live on 32 at that time?
1711 A. Yes, sir, William Berg.
Q. Where did he live?
A. Southeast of 32.
Q. Have buildings there?
A. Yes, sir, good buildings.
Q. How was that Section 32, all of it, in 1890 and years following as to cultivation?
A. Why, it was all cultivated land, we all had it farmed, broke up and farmed ever since.
Q. What was the quality of the crops raised?

A. Well, crops is according to how the weather is. Some years it is good and some years if the weather isn't favorable it wouldn't be so good.

Q. What was the condition of the land in 1890 and subsequent years as to water standing on it?

A. There was no water, it was dry.

Q. I take it that you have known that land ever since?

A. Yes, sir, been farming it ever since.

Q. Did you finally build buildings on your northwest quarter?

A. No, sir.

Q. Do you still own it?

A. My wife owns it.

Q. You have been farming it ever since 1890?

A. Yes, sir.

Q. Have you ever been troubled with water standing upon the lands?

A. It was last year.

Q. What year was that?

A. 1916.

Q. Did you have any crop there in 1916?

A. No, sir.

Q. Why?

1712 A. Too wet.

Q. How was it in 1915?

A. I had some crop in 1915.

Q. How much of a crop, what part of a crop?

A. I had in 80 acres of wheat and I got 850 bushels.

Q. Over 10 bushels an acre?

A. Yes, sir, and I had some oats, and I don't know how many I had in, had 700 bushels of oats and I had some hay.

Q. Were you troubled any with water that year, 1915?

A. Yes, sir, it was pretty wet.

Q. How was it in 1914?

A. It was wet in the fall that year, that is, it rained a lot, but we plowed, got all the plowing done.

Q. Were you able to plow in the fall of 1915?

A. No, sir.

Q. Why?

A. Too wet, rained all the time.

Q. Describe the conditions on the land and the lands around there in that vicinity generally through 1916 as to water?

A. Well, it was all wet, it rained all the time and you could not go out in the fields, simply wet, that is all. In 1915 I know there was six inches of water fell in the first of October.

Q. How did the year 1916 compare with all the other years that you have been there as to rainfall?

A. More than I ever seen it, never seen so much rainfall all the time I have been there.

Q. And as to water on the land?

A. Yes, sir.

Q. What would you say?

A. Well, it was just simply, just wet, mucky, you couldn't
1713 go out in the field.

Q. How was it compared with what you have seen before?

A. I never seen it like that before, never did.

Q. And what was the next worse year to 1916?

A. Well, 1915 it was pretty bad. Next thing to it that I can remember.

Q. That is, in respect to rainfall?

A. Yes, sir.

Q. And in respect to amount of water standing on the land?

A. Yes; well, there wasn't so much water standing on the land, simply rained all the time, never dried, stood right there.

Q. Take those three years, 1914, 1915 and 1916, and compare them with any prior period that you knew in that country, what would you say?

A. Well, I should say it is the worst I have ever seen it, never seen it like that before.

Q. Didn't those ditches help you any?

A. I can't say that it does; I don't think they helped a particle.

Q. Why?

A. Well, they didn't take the water away.

Q. There seems to be a ditch now along the north line of Section 32, was that completed in 1916?

A. It was completed from the creek and up halfway to that there northwest quarter but from there on it was a little piece left in there about, I should judge, about 20 rods that wasn't completed. That didn't seem to make any difference, it had a good flow from there down to the creek just the same.

Q. Yet it didn't help any on your land?

A. No, sir, it didn't help it because it had run full.

1714 Q. There was a ditch on the south line of 32 that had been built for a number of years, wasn't there?

A. Yes, sir.

Q. Didn't that do any good either?

A. I couldn't see it.

Q. Why didn't it help?

A. It simply rained so that it didn't make any difference if you had a ditch every 80 rods it didn't help.

Q. In 1915 did the ditches help?

A. It might have helped in some cases that the water wouldn't overflow the land but that is about all. It rained so much, I don't see they do any good, I never did.

Q. This Mustinka state ditch, do you remember when the first part of it was put in in the town of Redpath?

A. Yes, sir, that was 1894. I was up there when they were digging, put up hay up there that year.

Q. Did that ditch help your land any down here in 32?

A. No sir.

Q. Or any of the land around your land there?

A. No, sir, not a particle.

Q. Why?

A. Why, that is ten miles away from there.

Q. You say when they were putting in that first part of the ditch you were up there putting up hay?

A. Yes, sir, I put up hay that summer and I went over there and looked to see how they were working, it was only half a mile away from where my hay was.

Q. On what section of the town of Redpath did you put up your hay that fall of 1894?

A. I tell you, I have to get a map before I can tell you that, I ain't much acquainted up in there. It was where the school
1715 house is now.

Q. Near whose place were you putting up hay?

A. It is what we used to call the Dane woman there that used to have that place right across the road. Perhaps Mr. Hanson can tell you about it.

Q. Was it in a part of the Redpath slough, do you think, where you put up hay?

A. Yes, it was what they called the Redpath slough. I don't know what section it is.

Q. Did you put up hay there subsequent years to 1894?

A. No, I did not, that was the only year I put up hay up there.

Q. Where did you live, Mr. Monson?

A. I lived in Clifton.

Q. What section?

A. I lived on 29 that year.

Q. That is 1894?

A. Yes, sir.

Q. What part of 29 did you live?

A. Northwest quarter.

Q. Who owned that?

A. Fellow by the name of Blaisdell.

Q. You rented it from him, did you?

A. Yes, sir.

Q. Farmed it and operated it?

A. I did, part of it, I didn't rent it all.

Q. How long had that been settled?

A. That was settled there when I come there to the town of Clifton, at least, it was broke up.

Q. What kind of buildings were on it?

A. The house is there yet and there was a barn, a half roofed barn when I was there.

1716 Q. How was the land in a state of cultivation when you were there in 1894?

A. Good.

Q. How was it as to water?

A. There was none at all, it was dry.

Q. How long did you live on 29?

A. I lived there until in the fall of 1895.

Q. Then where did you move?

A. I moved down on the southwest of 32.

Q. How long did you live there?

A. 5 years.
Q. Farm that land?
A. Yes, sir.
Q. And carried it on in connection with this northwest of 32?
A. Yes, sir.
Q. After the five years on the southwest of 32 where did you move?
A. I moved on Section 21.
Q. What part?
A. On Section 21, the buildings is on the north half.
Q. How long did you stay there?
A. I am there yet.
Q. Have you been there continuously since what year?
A. Yes, sir, I moved there in 1900 and I am still there.
Q. And have you since 1900 continuously farmed that north half of Section 21?
A. Farmed the whole section.
Q. Farmed the entire section?
A. Yes, sir.
Q. What is the character of buildings on that?
A. Good, excepting the barn ain't very good, the rest of it,
1717 buildings are very good.
Q. Did you rent that land?
A. Yes, sir.
Q. And whom did you rent that from?
A. I have had so many landlords, I can't hardly tell you. The first time from a fellow by the name of Henry Gruver.
Q. Did he ever live there?
A. No, sir.
Q. Who settled that Section 21?
A. A fellow by the name of W. Hixson.
Q. Was he there when you came there?
A. No, he was not.
Q. Do you know about what year he settled there?
A. 1893, I think, 1893 or 1894, I wouldn't say for sure.
Q. During the time that you knew it before you went on there, did it have good crops?
A. Yes, sir.
Q. How was the land as to water?
A. We wasn't bothered with water them days, none of us.
Q. And were you bothered with water after you moved there in 1900?
A. Yes, I was last year.
Q. 1916?
A. Yes, sir, 1915, too.
Q. Did you have any crops at all in 1916?
A. Not a bundle.
Q. Did you farm the land down in 32 too?
A. Yes, sir.
Q. Didn't you have any crop there?
A. No, sir.

1718 Q. And did you farm all of Section 21 in 1916?

A. Yes, sir; I didn't farm it, I stayed on it, I couldn't farm it.

Q. Didn't you have any crop on any of it?

A. No, sir.

Q. What was the matter?

A. Rained too much.

Q. Is that the only year that you know of where you failed to get any crop at all?

A. It was the only year since I have been in the town of Clifton.

Q. This section 21 has a ditch along the north line of it, didn't that help it any?

A. I couldn't see it, it didn't help me none.

Q. Did it help any in 1915?

A. Well, I couldn't see that it helped me because I had 50 acres of corn there along the ditch on the west side of the house and it drowned out, I lost about half of it along the ditch.

Q. That was in 1915?

A. That was in 1915. No, it was in 1914; 1915 I didn't have any corn in.

Q. You say it was in 1914 that you had this corn next to the ditch and it was drowned out?

A. Yes, sir.

Q. What part of the year, what month?

A. It was in June.

Q. June, 1914?

A. Yes, sir, the ditch backed up on me.

Q. This Twelve Mile creek, I take it that you have observed this creek from time to time and its operations?

A. Yes, sir.

1719 Q. What will you say as to its overflowing its banks?

A. The Twelve Mile creek never overflowed, I never see it overflow all the time I have been there.

Q. Neither bank?

A. Only in the spring of the year in 1897 that it overflowed in the spring of the year when it was full of snow. That was the only time I have ever seen it overflowed and I crossed it last summer when the high water was and I crossed it the year before, never was over its banks, right there at the Herman road.

Q. It has been testified here that that creek overflowed to the east near there over to Five Mile creek probably?

A. No, sir, the creek never overflowed, not there. If it gets to the creek the creek takes it. The trouble is there isn't an outlet for them ditches big enough to take it to the creek.

Q. Do you have any special trouble with the operation of those ditches on account of their running east and west, Mr. Monson?

A. No, I don't think so. We have runs that goes northwest, we have two runs that goes northwest and they are open and they opens up before the ditches opens up in the spring of the year and they always open and take the water away before the ditches gets down

to the creek, and in the summer it is the same way, they take more water than the ditch does, them ravines what you call them.

Q. Do you mean there are two of those ravines into Five and Twelve Mile creek?

A. Yes, there is two goes through Section 20 and one goes through Section 29 down into the southwest quarter of 20.

Q. What do those ravines run into?

A. Into Twelve Mile creek.

1720 Q. You say those take the water better than the ditches?

A. Yes, sir.

Q. Why?

A. Because they have the natural slope of the ground, open up quicker in the spring of the year and don't get full of snow like the ditches do.

Q. That is why I asked you and I don't know as you understood the question, whether you had trouble with the ditches on account of their running east and west?

A. Well, yes, the trouble is this way, the water wants to go northwest and the ditch runs west and it dams the water on the south. That is the reason I don't think we have had any benefit for the amount of money they cost.

Q. Now, the Five Mile creek in the town of Clifton, what will you say as to its overflowing its banks?

A. I never saw it overflow, never did. Oh, it might overflow in a little bend, or something like that; there is lots of crooks in it and it might overflow its banks but never so it floods very hard, never goes over the banks that way.

Q. Never interfere with your crops in any way?

A. No, sir, not Five Mile creek, never; not in the town of Clifton.

Q. Take this territory in the town of Clifton from the south line of Section 31 easterly of Twelve Mile creek and clear over to the Grant county line and beyond.

—. It is all farming land, all cultivated land except perhaps some spots that is hay land that ain't been broke up yet.

Q. It has been testified here that was a particularly wet, swampy tract of land in there?

A. No such a thing. I can go right in the spring any year and drive over there any place with a big load of hay.

1721 Q. Always could since you have been there?

A. Yes, sir, solid bottom there, no swamp there.

Q. How is it over east in the town of Logan, Grant county?

A. Well, when you get east of Five Mile creek there is what you call—there isn't so good a soil, the grass ain't so solid and it is kind of sandy in there and it hasn't as good a bottom as on the west of Five Mile creek.

Q. And is it swampy?

A. No, sir, it ain't swampy but you sink down. There ain't no swamp, it is all farm land.

Q. But it is sandier, lighter soil?

A. It is sandier, lighter soil.

Q. Raise better corn over there, I should think?

A. They raise all kind of grain, as good grain as they raise west but it ain't quite as good a soil.

Q. Take that land just east of your town line of Clifton, the first two western sections of the town of Logan and the town of Gorton up to Norcross there, how is that land?

A. That is just about the same as the rest of the land. There is some land in there—there is quite a ridge going through from Five Mile Creek from 19 and up across there, clear up to Norcross all good high land.

Q. How is it, take that ridge from Section 19 to Norcross, take the land northwesterly of that?

A. It is the same as Clifton land, a little lower but farm land.

Q. Swampy?

A. No, sir, not swampy. I know what swamp is.

Q. Settled?

A. Yes, sir.

Q. Cultivated?

1722 A. Yes, sir.

Q. Has been for how many years, you say?

A. I know in 11 and 12 the McClymons farm, it was settled there when I came there.

Q. And how on east of there and northeast of the McClymons farm, is that settled up any?

A. Yes, sir, it is.

Q. Was it settled when you came there?

A. I couldn't tell you because I wasn't over in through there. When I was working out I didn't have a change to go around like I have later years.

Q. Did you go over to Norcross some time?

A. Yes, sir, I landed in Norcross the first year I was here.

Q. And went from there where?

A. To the town of Clifton. I stayed in Norcross a year, worked in Norcross a year.

Q. What did you work at?

A. Worked on a farm.

Q. Can you tell us anything about the settlement of the lands right west of Norcross at that time, whether there were farms in there?

A. Yes, sir, there were farms in there.

Q. Was it a swamp, any of it?

A. No, sir, you can't farm in swamp.

Q. Take the lands northwest of Norcross up in through the town of Redpath to the waters of the Twelve Mile creek.

A. I wasn't much acquainted in there but in the 80's I think it was I used to be through there clear up to Tintah and I teamed there, I drove there.

Q. That was when?

A. I think it was in 1888 or 1887.

Q. You think it was 1887 or 1888?

1723 A. Yes, sir.

Q. You were working out and driving a team?

A. Yes, sir, I was teaming and working out with the team.

Q. From where?

A. All over, I worked up to Tintah a lot that year and I used to go backwards and forwards, I used to make my home with Mr. Trip.

Q. You used to make your home down there with Mr. Trip in Section 32 of Clifton?

A. 31.

Q. And then you would go clear up across to Tintah back and forth?

A. Yes, sir, once in a while I would drive down there, probably once a month.

Q. Would you drive clear through to the village of Tintah or the township?

A. I did once but this fellow I worked for was west of Tintah so I just cut across.

Q. What section was he on in the township of Tintah?

A. It is so long ago I couldn't tell you.

Q. It was west of Tintah?

A. Yes, sir.

Q. In passing up through there during these years, 1887 and 1888, did you find the land swampy?

A. I drove through there any place wherever I wanted to go, cut right straight across. There was no roads in them days and I cut across.

Q. With what?

A. With a team; sometimes I had a buggy and sometimes I had a wagon.

Q. Would you have a load on the wagon sometimes?

A. No, sir.

1724 Q. Did you ever have any trouble getting through there?

A. No, sir; I used to hunt for the bridges across Twelve Mile creek, that was all.

Q. Did you see those Redpath sloughs in those days?

A. I didn't see any sloughs. I couldn't see any sloughs, it was all dry land to me. Sloughs has water in them, if I am not mistaken; I call them sloughs.

Q. Did you drive through there where the Redpath sloughs are, where you afterwards put up hay?

A. No, I drove west of there.

Q. Do you know the old Mustinka river?

A. Yes, sir.

Q. Through Sections 22 and 23 and 24 of Redpath?

A. Yes, sir.

Q. How was that in those days?

A. Well, they was dry that year.

Q. And you drove across it any place?

A. Yes, sir, I used to cross there by Neuman's, of course, the creek has always water in.

Q. That was in Section 7 of Redpath?

A. Yes, sir, I didn't pay much attention to the sections them days, I used to go straight across.

Q. How was the country settled up in those days?

A. There was quite a few settlers up in that, especially along the river.

Q. Farms?

A. Yes, sir, all farming.

Q. Raise any crops?

A. Yes, sir.

Q. Buildings on them?

A. Yes, sir, they wasn't as good buildings as they have now.

1725 Q. From the time you came there, Mr. Monson, on did you observe the settlement, filling up of the lands around Redpath and Clifton and other towns in there?

A. Well, I don't know so much about Redpath but Clifton, of course that has been my home place and I know how that was.

Q. How about the settlement and improvement of those lands east of the river as compared with the other?

A. Just as many settlers there in 1896 as there is now, just as many people.

Q. Are there lots of people there now?

A. Not very many, no, room for more.

Q. And as to the cultivation of the land?

A. Well, the old settlers there sold out, the homesteaders and all of them, they have been selling out and these fellows that bought they are keeping it for speculation and selling and renting and all this and that, so it has changed hands, but as far as the land it is just the same as it used to be.

Q. And generally speaking of that whole territory in through there east of the Twelve Mile creek, were you bothered any more with water in the early days than you are in recent years?

A. Been bothered more the last three years than we ever were before, I know that much.

Cross-examination.

By Mr. Bronson:

Q. Your land lies somewhat towards the southern part of Clifton township?

A. Yes, sir, that quarter I own, or my wife owns.

1726 Q. And you are farming Section 21?

A. Yes, sir.

Q. And your farm joins a portion of Mr. Rogers'?

A. Yes, sir, Rogers is on the east side of me.

Q. Rogers, who testified this morning?

A. Yes, sir.

Q. And you have been there on Section 21 since 1900?

A. Yes, sir.

Q. Generally speaking, you have been in this country that we have called in some of the testimony the delta zone, including part

of Redpath township and Clifton township and Tintah, over and back and across it different times since 1889?

A. 1887, I come there in 1884 but I never used to go around much until about 1887 when I was teaming it.

Q. And Twelve Mile creek is west of you and your land?

A. Yes, sir.

Q. And flows north?

A. Yes, sir.

Q. And as you have stated, it has well defined banks and scarcely if ever overflows?

A. Only saw it overflow once and that was in 1897.

Q. Then, in all the time you have lived there Twelve Mile creek, down near your farm I presume you are referring to?

A. Yes.

Q. I don't presume you mean Twelve Mile creek where it flows into the Mustinka river?

A. I don't know what it does there.

Q. But Twelve Mile creek west of your farm and down towards the Herman road never overflowed on either side, either west bank of east bank except the year 1897?

A. No, sir.

1727 Q. You have a county ditch going by your farm west and on the north side of your farm?

A. You mean on the tree claim or on the section?

Q. On Section 21?

A. Yes, sir.

Q. And also a county ditch on the south side?

A. No.

Q. On the north side and another county ditch——

A. Two miles south of that .

Q. —on the south side of Section 29?

A. Yes, sir.

Q. And also a county ditch on the north side of your land in 32?

A. Yes, sir.

Q. And also a county ditch on the south side of your land in 32, on the south line of Section 32?

A. Yes, sir.

Q. And all these ditches run into Twelve Mile creek?

A. Yes.

Q. Now, so far as Twelve Mile Creek is concerned, at the place you mentioned west of your farm and south of that, it had capacity to carry the waters of these ditches, didn't it?

A. I never seen it over the banks.

Q. You would say it had capacity to carry the water that came down the ditches because you never saw it overflow those banks?

Mr. Palmer: I object to that, the witness hasn't said that. The witness didn't say it had the capacity to carry the waters of those ditches. [illegible] said it didn't overflow its banks?

Mr. [illegible]on: Make your objection and let the witness answer.

(Question is read by reporter.)

1728 Mr. Bronson:

Q. Would you say it did or would you say it did not?

A. I think it will take the water that gets down in there, yes, sir, right on the south side there, south of the Herman road, it will take all the waters that gets into it.

Q. Are these ditches north or south of the Herman road?

A. Two on the south and the rest of them on the north.

Q. These three ditches you have talked about, two of them south of the Herman road and one north?

A. All three are south of the Herman road, or along the Herman road.

Q. These three ditches are open ditches?

A. Yes, sir.

Q. And generally speaking, how deep are they and how wide are they?

A. Well, I start in on the town line between Clifton and Dollymount. That I know was an 8 foot bottom ditch and averaged 4 foot deep from Twelve Mile creek to a mile and a half east of Twelve Mile creek. From there it was shallow only about a foot and a half deep, and when that gets full it overruns the road, goes right straight across northwest.

Q. That is county ditch #8?

A. No, it is county ditch #2.

Q. County ditch #2, yes; and then when it flows into Twelve Mile creek how deep and wide is it?

A. When it gets full it cuts across the road in 33 and goes right straight across 29 and goes into Twelve Mile creek.

Q. And goes across county ditch #7?

A. Yes, sir, it cuts right straight across, it didn't stop last spring and kept right on going.

1729 Q. Into Twelve Mile creek?

A. Into the run.

Q. But from the run into Twelve Mile creek?

A. Yes, sir.

Q. Now, county ditch #2, how deep and wide is that about where it empties into Twelve Mile creek?

A. There was an 8 foot bottom a mile and a half and it is about 3 feet deep, not over, it is filled up——

Q. And this other ditch, county ditch #7, how big is that?

A. That is a 5 foot bottom ditch.

Q. On the north of 32?

A. That is a 5 foot bottom ditch, about 4 feet deep.

Q. How wide at the top?

A. It is, I suppose, about 12 or 13 feet.

Q. And how big is county ditch north of Section 21?

A. Well, that was a 6 foot bottom ditch when it was laid out.

Q. And about how deep?

A. Along the section it averages 2 feet and a half deep when it was dug, I measured it.

Q. How deep is it where it enters into Twelve Mile creek?

A. That I couldn't tell you, probably three feet.
Q. How wide at the top?
A. About 15 feet.
Q. And all of these ditches carry the water westward into Twelve Mile creek?
A. Yes, sir.
Q. Those ditches there in 1915?
1730 A. Yes, sir.
Q. And in 1914?
A. Yes, sir.
Q. And did they have water in them in those years?
A. That #7 wasn't there in 1914, that came in 1915.
Q. And did they have water in them?
A. Yes, sir.
Q. And the water that was in them ran down the ditch into Twelve Mile creek?
A. I made a mistake there. There on the Herman road that #1 ditch, it run down to the ravine that goes through 20 and down through 17, it didn't get to Twelve Mile creek until it got north about 2 miles because the ditch wasn't deep enough on the west end to carry it.
Q. So the waters cut across where?
A. Across there where I told you. There is a run goes through there, Section- 17 and 8, goes clear down to 5 and then emptied into Twelve Mile creek.
Q. Some water run in those ditches?
A. If they were plumb full, if the ravines was plumb full, it couldn't take any more, then run down into Twelve Mile creek, had to be awful high.
Q. Do I understand that county ditch #1 will not carry any water into Twelve Mile creek direct west?
A. It didn't last year, no.
Q. None at all?
A. Some, not much, very little.
Q. Was the ditch open from the middle of Section 17 into Twelve Mile creek? How wide is that ditch at the bottom?
A. 6 feet.
Q. At the bottom?
A. Yes, sir.
Q. How wide at the top?
1731 A. 15 feet.
Q. How deep is it?
A. About 3 feet deep.
Q. Do you mean to say that at the time that they had the flood that that ditch was not full with 3 feet of water in it?
A. Not on the west side of that run it wasn't full.
Q. Was there any water in it?
A. Some, not much.
Q. How much?
A. About a foot.
Q. Does the ditch drop there or is it up?

A. It is a ravine that goes across there, it goes in the ravine.
Q. Is this county ditch #1 lower in southeast quarter of Section 18 than it is on the easterly side of Section 17?
A. It is now but it wasn't last year; it was dug out last fall.
Q. In 1916 was it higher in the southeast quarter of 18 than it was in the southeast quarter of 17?
A. The creek didn't go through there.
Q. There is a little corner there—look at the map; what I want to find out is whether or not there is a general slope of this ditch downwards towards Twelve Mile creek.
A. It has a slope until you get to that ravine in Section 17.
Q. That is the easterly side of 17?
A. Yes, sir.
Q. Does the ditch start to run uphill?
A. No, sir, the water goes down through there.
Q. Does the ditch from the southeasterly side of 17 run up-
1732 hill?
A. The ravine wasn't deep enough to take it up and it stopped.
Q. You saw the ditch dug?
A. Yes, sir.
Q. Was the bottom of the ditch from the southeasterly side of Section 17 over to where it runs into Twelve Mile creek run uphill?
A. Yes, sir, it was.
Q. Runs uphill?
A. Yes, sir.
Q. And when it got full it ran across over into Section 17 and part of 8 and Section 5 into Twelve Mile creek?
A. Yes, sir.
Q. How about this ditch on the north part of Section 32, does that overflow and run north too?
A. Yes, sir, it did; last spring it did.
Q. And does that ditch slope generally down to Twelve Mile creek?
A. It did but it didn't take the water.
Q. There was too much water?
A. Yes, sir.
Q. Couldn't carry the water?
A. Yes, sir; that is in the spring of the year the ditch was full of snow.
Q. After it was opened——
A. Then it took it.
Q. After it was opened and after the snow had gone it flooded, didn't it?
A. No, it went down then.
Q. In the summer of 1916?
A. No, sir.
Q. Wasn't it flooded in the summer of 1916, water high?
1733 A. She wasn't done last year, I couldn't tell you, it wasn't done until last fall.
Q. Then county ditch #2.

A. That overflooded.
Q. And the water went north of it?
A. Northwest.
Q. The ditches were not big enough to carry the waters that were there?
A. No, sir.
Q. Carried some?
A. Carried some, yes, sir, any ditch will.
Q. Now, in the olden days, before you had any ditches at all, those three ditches, these waters went through these runs, you say there are some runs there?
A. Yes, sir.
Q. You mentioned one that runs through Section 17 and 8 and 5, Clifton township?
A. Yes, sir, it goes through 28.
Q. And then there is a run that runs through 28 and 29, Clifton township?
A. Same run that goes through 28 and 29, and then there is one that goes through 29 and northeast of 32 and down in 33 and Section 4 in Dollymount.
Q. That makes about seven runs?
A. No, that is the same run that goes through 29 and 32 and 33 and down into 4 in Dollymount, that is where it starts.
Q. Same run that runs in a northwesterly direction towards Twelve Mile creek?
A. Yes, sir, runs into Twelve Mile creek.
Q. In the early days before the ditches were put down in there the water naturally would go down the runs?
A. Yes, sir.
1734 Q. Across the country?
A. Yes, sir; straight across, didn't bother nobody.
Q. And in 1897 they did that?
A. Yes, sir.
Q. And in 1905 they did that?
A. Yes, sir, before them ditches went in there.
Q. 1905 was still high water in the spring, wasn't there?
A. I can't remember.
Q. Can you remember 1908?
A. I don't remember any high water except the last two or three years.
Q. Do you remember 1905, whether it was a wet year or a dry year?
A. No, sir.
Q. Or 1908?
A. It was pretty wet that year, I think, but we raised a crop.
Q. And 1912?
A. 1912 we had a good crop.
Q. You call that a dry year, 1912?
A. I forget that. There was one year awful dry, I don't know what year it was, it was 7 years ago, I guess, 1910 that was.
Q. You put a crop in in 1914?

A. Yes, sir.
Q. Got a good crop that year?
A. Got half a crop.
Q. Half of a normal crop?
A. Yes, sir, about half a crop.
Q. Half of what you call an average crop?
A. Yes, sir.
1735 Q. 1915, did you get a good crop?
A. I didn't have a very good crop, no.
Q. How much of a crop did you have?
A. My wheat went 7 bushels to the acre.
Q. You had some oats and barley?
A. Yes, sir, oats went poor, it was too wet.
Q. 1916 did you plow in the spring?
A. I plowed a little in the spring, yes, sir, very little.
Q. Too much water?
A. Yes, sir, what I plowed drownded out.
Q. Put some wheat in?
A. Put in some oats, never cut it.
Q. No wheat or no barley?
A. No, sir.
Q. Cut some hay in that year?
A. Yes, sir, got good hay.
Q. How much hay in 1916?
A. 200 tons.
Q. On Section 21?
A. No, that was on a different section, I rented that.
Q. Where was that?
A. 25.
Q. Town of Clifton?
A. Yes, sir; well, I had some seeded down on the tree claim.
Q. In these years that you went up to Tintah you never saw any Redpath sloughs up there at all?
A. No, sir, I went right through, I never seen any water only Twelve Mile creek.
Q. There wasn't any water in the Mustinka river, was there?
A. Yes, sir, there was by Neuman's.
Q. Did you go through the Tintah slough?
1736 A. I couldn't tell you, I went right straight across. I don't know whether it was slough or high land; I went right straight across. I didn't know of any slough.
Q. Do you know where Teske lives?
A. Yes, sir.
Q. Go by that lake on that farm of his?
A. I didn't see any lake.
Q. All dry?
A. All dry, you bet you it was dry.
Q. Were you there in 1897?
A. No, sir, I wasn't up in there then.
Q. And this year you were through there was a dry year or a wet year?

A. It was a normal year, I think, if I am not mistaken.
Q. Weren't troubled any with waters down on your land?
A. No, sir.
Q. These ditches that you mentioned, these three ditches, apparently ran across this flow channel that you mentioned?
A. Yes, sir.
Q. Cut through it?
A. Yes, sir.
Q. And pretend to carry some water that formerly went over that channel and when the waters are high it doesn't do that, is that your observation?
A. Well, when the water ain't too high it will go down through the ditches, of course, the road will dam them.
Q. A ditch helps to carry off the water that is there?
A. If it don't get too much.
Q. Takes it off a little faster and more direct?
A. Oh, of course, it helps a little, yes, sir.
1737 Q. A ditch will take off water quicker than without any ditch or won't it?
A. I suppose it will but I had an idea, I can't see there is much benefit in it. It ain't a benefit for what money they cost, I tell you that.
Q. You were assessed for those?
A. Yes, sir.
Q. Did you raise any objection to the assessment?
A. I did, they wouldn't listen to me.
Q. County commissioners didn't listen to you?
A. No, sir.
Q. Mr. Rogers spoke about another ditch they were trying to get in, do you know about that?
A. Yes, sir, I have heard about it.
Q. Are you one of the petitioners for that ditch?
A. No, I am not.
Q. You got enough ditch business?
A. I have for mine.
Q. Where is this other ditch presumed to go they are petitioning for now?
A. They want to go on the quarter lines of Sections 23, 22, and 21 and 20 and down in through there.
Q. 24?
A. Yes, sir, 24.
Q. What for?
A. I don't know who wants it, the Herman fellows want it.
Q. What for?
A. I don't know what they need it for, make us pay taxes, I guess.
Q. You think that is the only reason the ditches were put in, to make you fellows pay taxes?
A. I don't know what other purpose.
1738 Q. You think the Herman fellows want to put it in to make you fellows pay taxes?

A. I don't see any other benefit, it don't do us any good.
Q. Would it do the Herman fellows any good?
A. I don't know.
Q. What good?
A. They want to get a sewer outlet, I guess.
Q. What for?
A. For the town.
Q. It needs it, does it?
A. That I don't know.
Q. That ditch is to empty into Twelve Mile creek?
A. No, it goes beyond Twelve Mile creek.
Q. If it goes beyond Twelve Mile creek it would certainly cross Twelve Mile creek, wouldn't it?
A. Yes, sir, it crosses Twelve Mile creek.
Q. Then it would empty into it?
A. No, sir, it is supposed to take it away from Twelve Mile creek, go down to the lake somewhere down in a gully south of Wheaton.
Q. That is the big Herman-Wheaton half a million ditch they are talking about?
A. Yes, sir.
Q. Supposed to cost half a million dollars?
A. Yes.
Q. That is the one that is in the courts now?
A. Yes, sir.
Q. And they are fighting about it now?
A. You bet we are fighting, we don't want to spoil our country.
Q. I think that Mr. Rogers stated there was some water
1739 backed off of the ditch in 1916?
A. It did.
Q. And went over some of your land?
A. It did.
Q. How much?
A. Well, backed clear up to the house and that is 25 rods from the road and the house stands on a high knoll there.
Q. How many acres did it cover?
A. From 40 to 80 acres.
Q. How long did it stay, 10 days or 12 days?
A. I couldn't tell you. I had to haul my Ford out to the road with a team for about a month, I thought. I don't know how long it was, I couldn't say.
Q. Was this flood then on your land for upwards of two weeks?
A. Yes, sir, all of two weeks.
Q. Did you plow in the fall of 1916?
A. Yes, sir, you bet I did.
Q. And got it all plowed?
A. Yes, sir, about 500 acres.
Q. Plowed the whole works in Section 21?
A. No, sir, not quite all. There is 130 acres I didn't plow last fall, 1916.
Q. Could have plowed it all?
A. Yes, sir, if I had got around to it.

Q. 1916, I understand you to say, was wet all summer?
A. No, it turned dry in July, turned dry in July, last July.
Q. Have some high water in July?
A. Around the 4th of July we did.
Q. And this high water that you had there at different times ran off?

A. What didn't run off, soaked away.

1740 Q. And it ran off there through the channels or in the ditches into Twelve Mile creek?

A. Sure, what could run, and what didn't run soaked away and evaporated away.
Q. In the spring did you have the flood condition about the same as you did in the summer?
A. Well, it was wet and then kind of dried off a little bit and then come rain again and got wet again, that is the way it kept on.
Q. At one time apparently your land was overflooded as you have described?
A. That was in June.
Q. I wondered if that happened in the spring when the spring snows went off?
A. It was flooded then, too, a little, but not so bad as is was in June. 28th day of May it was practically flooded, we had a big rain storm the 28th of June, I never saw anything to equal to it.
Q. Was the rain in June, 1916, greater than it was in June, 1914?
A. Yes, sir.
Q. Heavier for the month?
A. Yes, sir, I think it was. It looked to me as if it was.
Q. You didn't keep any weather records, anything of that sort?
A. No, sir, I did not, only just by guesswork.
Q. Have you got any other ditch proceedings pending to put in ditches except the one you mentioned right near you?
A. Not as I know of.
Q. That is the only one you know of?

A. That is the only one I know of.

1741 Q. And that is a bigger one than all these others?

A. That is what they say, what they tell me. I don't know anything about it, only what they tell me.

Redirect examination.

By Mr. Palmer:

Q. Has that Wheaton-Herman ditch that you mentioned, that is petitioned for, been established, Mr. Monson, by the court?
A. No, sir.

(Defendant's Exhibits 79 and 95, inc., marked.)

Mr. Palmer: We offer in evidence at this time Defendant's Exhibits 79 and 93 inclusive, being duly certified and authenticated copies of United States Geological Survey water supply papers, cov-

ering the data used in the preparation of the diagrams, Defendant's Exhibits 72 and 76.

Mr. Bronson: We object to them as being incompetent and immaterial, not tending to prove any issues in the case.

Mr. Palmer: We offer in evidence Defendant's Exhibit 94, being a certified and authenticated copy of stream gaugings on the Mustinka river, near Wheaton, for the period of June 7th to November 30th, 1916. We likewise offer in evidence Defendant's Exhibit 95, being certified and authenticated copy of stream gaugings in the Red River at Fargo, North Dakota, for the year ending September 30, 1916.

Mr. Bronson: Complainant objects to both offers as incompetent and immaterial, not tending to prove any of the issues in this case and encumbering the record.

1742 FREDERIC H. BASS being recalled on behalf of defendant, testified as follows:

Examined by Mr. Palmer:

Q. Professor Bass, in making the Exhibits 72 and 76, did you use the data contained in these Exhibits 79 to 93, inclusive, and Exhibits 94 and 95?

A. Yes, sir.

(Defendant's Exhibits 96 and 97 are marked.)

Q. I call your attention to Defendant's Exhibit 96, being a photograph; were you present when that was taken?

A. Yes, sir.

Q. What is that a photograph of?

A. It is a photograph of the east bank of Twelve Mile creek just north of the Mustinka ditch, showing the effect of the spring flood of 1917 passing north across the ditch.

Q. Also Defendant's Exhibit 97; were you present when that photograph was taken?

A. Yes, sir.

Q. What is that?

A. It is a bridge over Twelve Mile creek just north of the Mustinka ditch, looking northwest. It shows the effect of the spring flood passing north across from the Mustinka ditch. Both of these photographs were taken about May 7th or 8th, 1917.

Mr. Palmer: We offer in evidence Defendant's Exhibits 96 and 97.

1743 CHRISTIAN H. CHRISTOPHEL, being sworn in behalf of defendant, testified as follows:

Examined by Mr. Palmer:

Q. How old are you?

A. 55.

Q. Where were you born?

A. Northern Indiana.
Q. Where do you live?
A. Norcross.
Q. What is your business?
A. Farming.
Q. Do you live in the village of Norcross or do you mean that is your post office address?
A. No, sir; that is my post office address.
Q. Where do you live?
A. On the southwest quarter of Section 17, Gorton, 128, 44, Grant county, Minnesota.
Q. How long have you lived on this southwest quarter of Section 17, Gorton township, Grant county, Minnesota?
A. 18 years.
Q. What year did you come there?
A. In the year of 1899.
Q. What part of the year 1899 did you come there?
A. In the spring, March.
Q. Was that when you first came to this country from Indiana?
A. No, we lived two years in northwestern Iowa; that is, we lived in Illinois for some years, two years in northwestern Iowa.
Q. Have you been a farmer all your life?
A. Yes, sir.

Q. When you moved on this southwest quarter of Section
1744 17 in Gorton, did it have buildings on it?
A. No, sir.

Q. And was it cultivated land?
A. No, sir.
Q. Did you buy it or homestead it?
A. I bought it from the railroad company.
Q. And did you build buildings there?
A. Yes, sir.
Q. How soon after you bought it.
A. In May we put up a shed of a house.
Q. And afterwards better buildings?
A. Yes, sir, reasonably good buildings at present.
Q. So at the present time you have good farm buildings?
A. Yes, sir.
Q. And have you cultivated and farmed this land ever since you came there in 1899?
A. Yes, sir, several years breaking it up and cultivating it.
Q. Mr. Christophel, at the time you came in 1899, was this first part of the Mustinka state ditch constructed?
A. Yes, sir.
Q. How far is the source of that first part of the Mustinka state ditch from your farm buildings?
A. Just about a half a mile to the south, the river is to the south of the buildings.
Q. And the ditch starts right in the river where it passes through the quarter section on south of your place, does it?
A. Yes; well, just a little west.

Q. Perhaps a little west from your buildings?
A. Just a trifle where it starts in the old river bed.
Q. That would be in the northwest quarter of Section 20 then, that the ditch starts in the old river bed?
A. Yes, sir.
1745 Q. Who owns that quarter in which the ditch starts?
A. Mr. Johnson is farming it and I am inclined to think that his father owns it. He has never said much in regards to that but it appears so.
Q. Are there farm buildings on that?
A. Yes, sir.
Q. And is it being cultivated?
A. Yes, sir.
Q. Has it been ever since you have been there?
A. It has.
Q. The quarter section right south of where this ditch starts, being the southwest quarter of 20, who owns that?
A. I own that.
Q. How long have you owned that?
A. This is our fifth crop.
Q. Do you carry on and farm that in connection with your home farm, the southwest of 17?
A. Yes, sir.
Q. How far is your house from this Great Northern Railway bridge across the Mustinka river and just northwest of Norcross that has been mentioned here several times in the testimony?
A. Approximately a little better than half a mile, a little over half a mile, to the west.
Q. The house is to the west of the railroad bridge?
A. Yes.
Q. And somewhat to the north?
A. Well, of the railroad bridge, you mean?
Q. Yes.
A. It is somewhat to the north, it is I should judge 30 or 40 rods north to that road leading west to our buildings.
Q. About how wide is the old river there in Section 20 westerly of the railroad bridge?
1746 A. It would be hard for me to estimate, I haven't taken any thought as to the width of it.
Q. Could you state it approximately somewhere near, Mr. Christophel?

Mr. Pinkney: We object to that as it appears the witness has never taken any thought, it would be a mere guess.

A. It would be, I should judge, the width of it probably would be 60 or 70 feet at the top.
Q. You mean, the old channel?
A. Those bridges, I can tell you the sizes of the bridges they have in there, 16 foot bridges over those roadways that they have across the river.
Q. And when you say 60 or 70 feet, what do you mean?

A. That would be the surface of it, the top surface of the slope and downwards. *If* course, that takes in some of the low land probably in places along the side of the river.

Q. Since you came there, speaking particularly of this part of the river through Section 20, have you known of its overflowing its banks?

A. Yes, sir.

Q. And on which side, if one more than the other, does the river overflow there through Section 20?

A. Through Section 20, I would rather think it would—well, it overflows partly on both sides, as you get down to the western part of 20 it overflows more to the south than it does north, and to the upper end of 20, northeastern corner of 20, it overflows mostly to the north.

Q. And in what direction does the overflow water run?

A. Mostly northwest.

Q. Now, does it overflow any easterly of the railroad bridge, on the east side of the track?

A. At times right near the railroad, it has overflowed some there.

1747 Q. What is the direction of that overflow water?

A. It seems to follow the right of way, part of it follows the right of way for probably 100 rods or such a matter and crosses the right of way, while some of it goes on north for a mile and a half and then crosses the right of way and leading directly west for a ways and then northwest again.

Q. Well, where you say that from easterly of the railway it overflows, tell us where it follows the right of way, in what direction?

A. To the northwest.

Q. And is there any other opening along the railroad grade northwesterly of the railroad bridge proper across the river?

A. How far north?

Q. Where the water goes through?

A. As to water out from the river?

Q. Yes.

A. There is a small culvert, at the present time there is a small culvert about 100 rods north there along the right of way and then again they have culverts a mile north, just a little over a mile north of the river, across the public highway there, they have culverts in the Great Northern, and also have a culvert in probably half a mile further up where the water still leads across.

Q. In fact, going from Norcross to Charlesville up the Great Northern tracks northwesterly, are there quite a large number of those culverts under the tracks?

A. Not a large number, no, sir. I don't know as I can recall how many. I have noticed several of them near Charlesville, they have got large culverts in there.

Q. And through those various openings which way does the water flow?

A. West.

1748 Q. Westerly?

A. Westerly.

Q. And then takes what course?

A. Mostly west; as you get up near Charlesville, I am not so well acquainted there, I don't know as I can describe it as to what course it takes, mostly west, I think.

Q. Take the openings down toward your place, the ones you are familiar with, after the water passes westerly under the railroad grade, what course does it take?

A. It takes a course to the northwest. There is a fine ravine running through the northeast of Section 18, leading on through the corner of 7 and down through 12 in Redpath. That practically is as far as I really know the course of this water. It seems to gather in Section 7, this water leading up along the right of way for a mile and a half; they seem to lead together there in the southwest of 7, into quite a large channel, leading off to the northwest.

Q. And what is the ultimate destination of those overflow waters, so far as you know?

A. Well, it is probably as far as I really could give evidence to, as I never followed it up more than what different ones has told me, it leads off into the Tintah slough.

Mr. Bronson: I object to the witness testifying as to what others have told him as hearsay and ask the witness to confine his testimony to actual observations.

Mr. Palmer:

Q. You will speak particularly about what you observed about the flow of that water, Mr. Christophel, and I wish you would tell us specifically about the overflow in the northeastern part of Section 20 which you have mentioned as going northwest. Are there defined flow channels for those overflow waters leading to the northwest?

1749 A. There is no defined channels leading away from the river. There is quite an number of acres there that seems quite level after it leaves the river there. When the river does overflow it seems to overflow over quite a scope of country there until it gets out and leads west and then it seems to run together more into those—gathered up in those channels more.

Q. Such water as overflows in this easterly part of Section 20 but westerly of the railroad grade, does that pass across your place?

A. Some of it does.

Q. That is, your home place, I mean?

A. Yes, sir, some leads up along the public highway ditches, roads that has been graded up and ditches cut out but most of it usually leads up the road, along the road to the west, or a great part of it anyway.

Q. What road to the west do you speak of?

A. That is south of 17, between Sections 17 and 20.

Q. Then what direction does it take, what course does it take, you say it seems to flow along the road to the west, and then what is the course?

A. It leads on west and then again in high water it runs out over

the land again different places. When the water is high it seems to have a tendency to lead off to the northwest.

Q. Take the land easterly of your place but westerly of the railroad right of way, that is, such part of the southeast of 17 as is westerly of the railroad grade, does the overflow water from the river flow across there?

A. When the water is high it runs down over the southeast of 17.

Q. Does it run more over the part of the southeast of 17 west of the railroad track than it does of the part east?

A. Somewhat more, yes, sir.

Q. Mr. Christophel, you say you came here in 1899?

A. Yes, sir, in the spring.

1750 Q. Did you observe any overflow of these waters from the river across your lands and the lands adjoining on the east?

A. Yes, sir, the first spring we were there we had a heavy rain and hail on Decoration Day, I remember it very well. It seemed to pour down. I remember it seemed to rain about 5 or 6 inches, there were some jars setting in the yard there. And immense rain we had during that part of the years and it let up, the rain let up and I got in the balance of my crop that spring, I was breaking for flax.

Q. Tell us what land was overflowed or portion of it in the rain you speak of.

A. The overflow came a little later then that summer. The overflow came about harvest and there was—I should judge there was 60 probably 60 acres of that quarter under water at that time.

Q. What quarter?

A. Of the southwest of 17.

Q. Your land?

A. Yes, sir.

Q. 60 or 70 acres under water?

A. At one time.

Q. In harvest time, 1899?

A. Yes, sir.

Q. Where did that water come from?

A. Came from the river.

Q. And what direction did it go?

A. It kept leading to the northwest.

Q. How deep was the water on your place?

A. Probably a foot or a little over.

Q. How was the current?

A. The current was good.

Q. Quite strong current?

A. It was.

1751 Q. Going off to the northwest?

A. Yes, sir.

Q. What was the condition down there around the river itself through Section 20?

A. The condition there where this neck of the river leads off to the north in the northeast of 20, the fall being to the northwest and the river leading off to the north, why, for, I wouldn't know how many rods I should say but it is quite a ways, anyway.

Q. As shown on Defendant's Exhibit 4, you mean, this map?

A. Well, this part of it right in here where this river leads down around to the north.

Q. I say, as shown on this map?

A. Yes, sir. The river don't seem to have any chance whatever and the fall being to the northwest as soon as the river gets up to its banks, you might say, it naturally would lead right off away from the river, leading that direction.

Q. To the northwest?

A. To the northwest, that is what seemed to cause the most trouble in there, I think.

Q. You say this first section, first part of the Mustinka ditch was constructed, then didn't that take the water?

A. It didn't seem to.

Q. For how long a time was the water on your land a foot deep and going to the northwest that harvest time in 1899?

A. It stayed almost that same depth until the river quit coming, naturally after the freshets would be over it would keep coming slower and be less water.

Q. Can you mention about the number of days?

A. Some years ago it used to keep——

Q. That year particularly?

1752 A. It probably came over for a matter of ten days to two weeks, such a matter.

Q. What is the next time that you remember of the water coming across your place?

A. In 1900, second year we were there.

Q. What part of the year?

A. That was along near harvest time. We had it very dry in the fore part of the summer. I again had put in flax that spring and on account of the overflow in the spring the flax didn't come up. We didn't have any rain until the 2nd day of July—I remember that distinctly—began to rain then and during the harvest there was any amount of grain that couldn't be harvested on account of the excessive rain not alone under this overflow but also in other sections as well.

Q. Were you able to get your harvesting done that year?

A. I didn't get it all done, I couldn't get my oats, part of it.

Q. Why?

A. On account of the wet, excessive rain, although I had my oats east of Norcross that year.

Q. You had some oats up there?

A. Yes, sir, I had some ground rented.

Q. Were you able to get that harvested?

A. I was not.

Q. Speaking particularly of this harvest time in the year 1900, how much of a stream or expanse of water went over to the northwest, overflow from the river, at that time?

A. There wasn't very much of an overflow at that time as it semed to be the excessive rains, that seemed to hinder us mostly.

Q. Was there some overflow to the northwest from the river?

A. There was some overflow that year.
1753 Q. As much as in the previous years?
A. Not as much, if I remember right.
Q. Nor for as long a time?
A. No.
Q. Didn't this ditch carry the water away, this Mustinka ditch?
A. No, sir.
Q. Didn't seem to help any?
A. Didn't seem to take it away, couldn't get down to the river fast enough to, it seemed.
Q. What is the next year that you remember of overflow to the northwest across your place there?
A. Outside of spring freshets on account of ice and snow lodging in the spring when it opened up?
Q. Yes.
A. I remember the summer of 1906 we had right in our neighborhood there, there was quite a few sections hailed out and in the meantime we had heavy rains, wet, so much so that we could scarcely get our harvest that year.
Q. I wish you would speak particularly of this overflow, if any, from the Mustinka river across your land.
A. There was an overflow that year.
Q. When?
A. 1906.
Q. What part of the year?
A. That would have been along in about August, harvest was almost ready to cut when we got that hailstorm, I remember. It must have been along in August that we got this overflow again and these excessive rains.
Q. And to what extent did the water run across your land that year?
A. Well, I don't just remember distinctly but I remember we were flooded quite bad again that year.
1754 Q. Which way did the water go?
A. To the northwest.
Q. How deep was it?
A. It seemed to me it was, by the width of it, some of the places about a foot deep. There was a width there probably 20 or 30 rods across the farm there.
Q. Considerable current to the northwest?
A. Yes, sir, current was good.
Q. Didn't this Mustinka state ditch seem to help any there?
A. It didn't seem to, probably it helped some, naturally would help some, of course; two streams would carry more water than one, I suppose.
Q. But you don't know, of course, how much water went across before the construction of this ditch?
A. No, sir.
Q. But the ditch and the river together didn't seem to be able to take care of it?
A. No, sir.

Q. How was it in the spring, you mentioned spring freshets, at the time of the breaking up of the snow and ice?

A. Our overflow would be quite frequent in the springs and while the snow would be lodged in the river, not leaving the water through.

Q. And from the time you came there, would you say there *there* was an overflow at the time of the break-up in the spring each spring to the northwest?

A. Not every spring, it depended mostly on our winters, the amount of snow that would lodge in this river.

Q. How frequently, how many springs would you say?

A. Almost seemed as though there was a third of the springs.

1755 Q. After 1906 when is the next year that you remember of a summer flood or flood aside from the spring break-up?

A. I remember the year 1907, we had it unusually wet but I couldn't recall as to the overflow that year.

Q. Did you have an overflow that year?

A. I wouldn't be able to say.

Q. What is the next year that you recall then distinctly when you had a summer flood overflowing to the northwest in the summer?

A. Well, the year 1915, I recall that year.

Q. Tell us about 1915.

A. In 1915 we had an unusually wet year and if I remember right we had some overflow that year. I remember now recalling of some crop that we had in on certain parts of the farm in 1915 were flooded.

Q. What part of the year?

A. It was along about midsummer—rather, the fore part of the summer, it spoiled our barley, and part of the field overflowed.

Q. June or July, what time do you mean?

A. I think it was along in June and July.

Q. How extensive was that overflow in June and July, Mr. Christophel?

A. That was, I think that was one time that it overflowed in that year.

Q. Have you some photographs taken of that overflow there in the summer of 1915?

A. I have.

Q. Will you produce them?

A. I haven't any to show that farm of mine, I have some of those the boy had taken up the river.

(Defendant's Exhibits 98 to 103 inc. marked).

1756 Q. What is Defendant's Exhibit 98?

A. This was taken in June, 1915, probably along after the middle of June. It is a photograph of what they call the old Engstrom farm. That is located in Section 16, Redpath township. There is another one that goes with that. These buildings that is the barn and granary.

Q. The old Engstrom farm, showing the condition around the buildings there in June, 1915?

Mr. Bronson: That is objected to unless he saw those conditions.

A. Yes, sir.

Mr. Palmer:

Q. Did you see those conditions?
A. I didn't see those conditions at that time but I have gone by there when conditions were almost the same.

Mr. Bronson:

Q. When, same year?
A. No, I believe I better recall that. I have seen it wet there but I haven't seen it as bad as that. In fact, I haven't been going out there during those times to investigate.

Mr. Palmer:

Q. Who took this photograph, Exhibit 98?
A. Charley Beach.

Mr. Bronson: They are objected to unless he saw them taken.

Mr. Palmer:

Q. I thought you said your boy took this?
A. He didn't take those. He has taken some of those others there, Mr. Beach has taken those (indicating various photographs), the same time that my son took the others.
Q. Mr. Beach took those at the same time your son took the others?
A. Yes, sir.
Q. Then we will leave that out, Exhibit 98, if you didn't take it or know of its being taken. This one, Exhibit 99, is that
1757 one that Mr. Beach took, too?
A. That is one of Mr. Beach's.
Q. Now, Exhibit 100, what is that?
A. That is one of Mr. Beach's. That was taken on Section 16, I guess it is.
Q. Exhibit 101, what is that?
A. My son took that.
Q. When?
A. About the latter part of June.

Mr. Bronson:

Q. Did you see him take it?
A. I didn't see him take it. He spoke of going down to take those pictures and I saw him going down there to get those pictures and that he had taken them.

Mr. Palmer:

Q. Did you see the conditions there at the point where, the point represented by this picture?
A. Yes, sir, I saw the conditions.
Q. And are they as represented in that picture?
A. Yes, sir, they are as represented by this picture.
Q. Tell us what the picture is, Exhibit 101.
A. This picture represents this bend right in here (indicating).
Q. Represents the bend of the river in the northeast quarter of Section 20, Gorton township?
A. Yes, sir.
Q. And when, at what time?
A. Along the latter part of—after the middle of June.
Q. 1915?
A. 1915.
Q. The water outside of the current of the river, as shown on that picture, where did that water go, Mr. Christophel?
1758 A. That water leads off around here and in another picture we have there we could probably describe it better, leads off away from the river down to the northwest.
Q. That shows the overflow water from the river going to the northwest?
A. Yes, sir.

Mr. Palmer: We offer in evidence Exhibit 101.

Q. What is Exhibit 102?
A. That is taken right at those buildings in the southeast quarter of 17. Those buildings are located in between this line here and the right of way, half line.
Q. In between the quarter line of Section 17——
A. Yes, sir, they are located halfway between the quarter line and the right of way here on the—the house stands on 17 and the barn is located in 20.
Q. That is, those are the buildings between the east corner of your land and the railroad grade?
A. Yes, sir.
Q. And in that part of the southeast quarter of Section 17 which lies westerly of the railroad grade?
A. Yes, sir.
Q. And what is the water shown there on that exhibit?
A. That is some of the water leading right past the barn here, coming out from that bend that is shown in this other exhibit leading down here to the public road, leading west here.
Q. Where?
A. On the Section line between 17 and 20. This is the public highway to the right of the picture but you don't see the highway. This is the ditch leading along the side of the public highway, leading west. This is the south ditch, you haven't got the public road here, it shows the ditch there and shows the water up around the building.

1759 Q. Shows the water flowing in what direction?
A. West, some of it leading off to the north.

Mr. Palmer: We offer in evidence Exhibit 102. Exhibit 103 is withdrawn for the present.

(Defendant's Exhibits 104 and 105 marked.)

Q. What is Defendant's Exhibit 104?
A. That was taken on the west of the southwest of 20.
Q. When?
A. In the latter part of June, 1915.
Q. That would be the west side of your quarter section, southwest quarter of Section 20?
A. Yes, sir, looking east.
Q. At what?
A. Across the old river bed.
Q. That is the southerly bend of the river in the southwest quarter of Section 20, as shown on this map, Exhibit 4?
A. Yes, sir.
Q. And does it correctly show the condition there at that time?
A. It does.
Q. How extensive was the flood of the water there at that time?
A. The old river bed had spread out over its banks there for, at some places probably from 20 to 30 rods wide.
Q. Wasn't this Mustinka state ditch operating at the time?
A. Well, that was running full at the time.
Q. But it didn't seem to take care of the water?
A. It couldn't take care of all of it.

Mr. Palmer: We offer in evidence Defendant's Exhibit
1760 104.

Q. What is Defendant's Exhibit 105?
A. That shows the water practically at the same place with a little different view. The other was taken from Section 19 looking across the section line road here, looking across the road to the east; where this was taken from the section line looking east of this overflow of the bend of the river around in the southwest quarter of Section 20.
Q. Does that correctly show the conditions as they existed there in June, 1915?
A. Yes, sir.

Mr. Palmer: We offer in evidence Defendant's Exhibit 105.

Q. Now, for how long a period in this summer of 1915 did you have that flooded condition and that condition of overflow from the river to the northwest, Mr. Christophel?
A. Well, there was—one of those years that this old river bed had water in, 1915 or 1916, this old river bed had water in practically all summer—it usually dries up during—only during those freshets the state ditch isn't able to take care of the water.
Q. I am not asking you so much how long the water stayed in

the old river bed, how long did you have that condition of flowing across to the northwest?

A. Those conditions did not—I don't believe they lasted—usually lasted nearly two weeks, at times, there was at one time they lasted a good deal longer but I can't recall the time now.

Q. Was it in 1915?

A. I rather think it was in that year, that it stayed on.

Q. Was that later than June, 1915?

A. That was from June on, about the middle of June.

1761 Q. You think it was a longer period than two weeks, do I understand you?

A. I should judge about that length of time.

Q. How was it in the fall of 1915, Mr. Christophel, as to condition of flooding there?

A. We had it very wet in the fall as we couldn't do our plowing; the south quarter we had there, we got about 30 acres plowed on there we put into wheat the next spring, was all we could get plowed of that quarter in 1915.

Q. By that quarter you mean the southwest quarter of Section 20?

A. Yes, sir; I think we got most of the home place plowed that fall, so that——

Q. What prevented your plowing?

A. Continuous rains.

Q. What was the condition of your lands there when it froze up in 1915?

A. It dried off, it had dried off some later in the fall.

Q. The spring of 1916 at the time of the break-up, did you have any flooding there?

A. We had floods during the early spring while the snow and ice was in the river.

Q. Floods to the northwest, you mean, across your place?

A. Yes, sir, and later on in seeding time our ground didn't work up good, but as to the floods of 1916, we had our worst floods in July. We celebrated down by the river, I know, that year, trying to stop some of the water from coming over.

Q. That is the way you celebrated the 4th of July was trying to stop some of the water from coming over onto you?

1762 A. Yes, sir, we did that year.

Q. Where did the water come from?

A. The river.

Q. Overflowed from the river?

A. Yes, sir.

Q. Running across your place?

A. Yes, sir.

Q. To the northwest?

A. Yes, sir.

Q. And also across this place east of you in 17?

A. Yes, sir, it run right across the buildings there as shown, to the north and east of the buildings or, rather, mostly right by the buildings from there on west for 40 rods. It seemed quite level there for a ways, lead right off across the road anywheres into the field and down to the northwest.

Q. How wide an expanse of water did you have there passing to the northwest?

A. Next to the road?

Q. Well, I mean, say, across your place.

A. At times it would be a width there of 20 to 30 rods for a short time.

Q. And across this place east of you?

A. At one time there, there was water running across clear nearly to the track on the east of me, not the whole thing being covered but different places where it would be lower you could see the water running down across.

Q. What depth of water across your place and across this place to the east of you?

A. Across the low places, probably be places where there was a foot of water.

Q. And that place easterly of you?

A. Well, next to the buildings there, I have seen water
1763 there seemed to be almost boot-top deep.

Q. In 1916?

A. Yes, 1916; I remember we had an awful time trying to keep our roads in condition so we could get out.

Q. Was this in the summer of 1916?

A. Yes, sir.

Q. Was there considerable current to the water to the northwest?

A. There was a good current.

Q. For how long a time did you have that water flowing over your land and the land to the east of you to the northwest?

A. Just as soon as the river would stop it would drain off and the surplus water would drain off in a day, something like that.

Q. Then would come up again later, you mean?

A. It would not unless the river would come up.

Q. I am asking you about how many days, how long a period did you have those flooded conditions there with the water running northwest?

A. Well, it would be probably two weeks at a time.

Q. And how many different times during this summer of 1916 did the water come up that way and flow northwest for perhaps two weeks at a time, how many times?

A. I can't recall only the one time of the overflow.

Q. Then was when?

A. In July.

Q. Did you have any crop in 1916?

A. I had some crop, 800 bushels of oats.

Q. Where?

A. Off of 17.

Q. Did you have any crop down in 20?

A. No, sir.

1764 Q. Southwest of 20?

A. No, sir.

Q. How much wheat did you say you had in on the southwest of 20?

A. About 32 acres.

Q. And what other crops?
A. That was all on the southwest of 20.
Q. Was that all you could put in?
A. That was all I coud get in, we wasn't able to get any corn planted, couldn't plow, couldn't do a thing.
Q. And did you raise any wheat on this southwest of 20?
A. No, sir, I didn't harvest it.
Q. Or any crop whatever?
A. No crop.
Q. What was the matter?
A. Well, in the first place we had the overflow there in the spring, caused our ground to keep wet quite late to get it seeded, in fact, it was too wet for it to grow, continuous rains, too much rain.
Q. On your home farm, southwest of 17, you say you threshed 800 bushels of oats?
A. Yes, sir.
Q. Where were those oats?
A. Those were in the northeast forty of the farm and also—well, you could describe it as the north half.
Q. The higher land?
A. Some of the higher land.
Q. Did you have any wheat on your home farm?
A. No, sir.
Q. Did you put in some?
A. No, sir.
1765 Q. Did you have any corn?
A. No corn.
Q. Why not?
A. Couldn't get the ground plowed to get it planted on account of the continuous rains.
Q. Now, 1915 did you have a good crop?
A. We had some crop.
Q. On your home farm, how was your crop, what part of an average crop?
A. We had some barley, I can't recall just how much of a crop we had.
Q. What part of an average crop did you have? Did you have a half a crop, or two-thirds of a crop or whole crop or what did you have, Mr. Christophel, in 1915?
A. I know we didn't have very much of a crop, I was trying to think what there was.
Q. I don't care what there was, I want to know somewhere near about what percentage of an average crop there was. I don't mean the number of bushels of each kind of grain, I don't care anything about that.
A. I think I had somewheres about half of an average crop that year on the home quarter, southwest of 17.
Q. And what part of an average crop did you have on the southwest of 20?
A. No crop at all.
Q. In 1915?

A. No, sir.
Q. What was the matter?
A. Couldn't get the crop in.
Q. On the southwest of 20?
A. Yes, sir.

Q. You didn't have any crop at all on the southwest
1766 of 20 in 1915?

A. No, sir. I had in 30 acres, didn't harvest it.

Q. What was the trouble on your home farm that you didn't have but half a crop in 1915?
A. Too much, excessive rains.
Q. Go back to 1914.
A. 1914 we had a reasonable good spring. We had our plowing done the fall before and we got our crop all in in good shape and the spring come on good. Then we had the rains come on in about June again. It hurt the crop considerable, and then we had it wet again, along in June and July we had it wet up until harvest time. The one quarter we had rented southwest of us, we couldn't only cut the high places on account of there being so many dips in this creek and we had to get around those dips, leaving all the low lands, as we couldn't get through with the harvester, water standing in places.
Q. After these excessive rains in June, 1914, did you have some overflow of the river?
A. Yes, sir, we had overflows in that year.
Q. From the river to the northwest?
A. Yes, sir.
Q. But not so marked as in 1915?
A. Not so continuously.
Q. This overflow passing to the northwest as you described in the other years?
A. To the northwest.
Q. Since you have been there from 1889 on, how did those three years, 1914, 1915 and 1916 compare with any other years that you knew there, Mr. Christophel?
A. It didn't seem to be any difference between 1899 and 1900, and as to 1915 and 1916, I think there was a longer wet spell in 1916, more continuous rains than there was in those former years.

Q. And 1915——
1767 A. Yes, sir.

Q. Was there more continuous rains than in any previous years you had known?
A. Yes, sir.
Q. What has been your observation as to the old channel of the Mustinka river, whether that carries water along where it is intersected by this Mustinka state ditch westerly of your place; does it carry water?
A. It does, at times.
Q. Water standing in it at times, too?
A. In the year- 1915 and 1916 the old river bed almost had

water in continuously the whole summer, something very unusual, as the state ditch takes care of it at other times, only it overflows.

Q. But at times of overflow it doesn't seem to take care of it?

A. It doesn't take care of it.

Cross-examination.

By Mr. Bronson:

Q. It would appear, Mr. Christophel, in the years that you have lived there from 1899 up to and including the year 1916, you have been troubled more or less with overflow waters and flood waters in many conditions of considerable rainfall?

A. Yes, sir.

Q. The Mustinka river runs into this Mustinka state ditch somewheres near your farm?

A. It does.

Q. And the Mustinka river, east of this Mustinka state
1768 ditch, winds around considerable, doesn't it?

A. About the same as it does down through Section 20.

Q. And the same as the old Mustinka river did down through Section 20?

A. Yes, sir.

Q. It winds back and forth across the sections as it goes easterly?

A. It does somewhat when it goes through 21——

Q. 21, 22, 23, in Gorton township?

A. Yes, sir.

Q. When springs freshets would come or times of considerable rainfall, waters that came down this Mustinka river would overflow the channels, as you noticed near your farm?

A. Yes, sir.

Q. Now, southeast of Section 17 you have the old Mustinka river, have you not?

A. Yes, sir.

Q. And practically south of your farm, Section 17, you have the Mustinka state ditch, about half a mile south of your farm, joining with the old Mustinka river?

A. Yes, sir.

Q. That is in Section 20, isn't it, where the Mustinka ditch joins the old Mustinka river?

A. Yes, sir, approximately 80 rods from the——

Q. And it is in that vicinity of Section 20 that you have been talking about, that you have noticed overflow of the river from year to year, and you have described it in your direct examination?

A. Yes, sir, it is in 20, all in 20, right near the river.

Q. And some of this overflow you have mentioned also extended up to Section 17?

1769 A. From 20?

Q. From 20?

A. No.

Q. Your home place is Section 17?

A. Yes, sir.

Q. Where did you get the water from there?

A. From the northeast of Section 20.

Q. Where the old Mustinka river crosses the northeast of Section 20?

A. Yes.

Q. That is to say, Mr. Christophel, as the flood waters came down from this territory east along the Mustinka river—you know there is territory east, adjacent and bordering on the Mustinka river, do you not?

A. There is.

Q. You have been along the Mustinka river east?

A. Yes.

Q. And you have seen the Mustinka river up in this territory, running north, have you not, north and east, as shown on this Defendant's Exhibit 7, running over into Gorton township and Delaware township and Elbow Lake township and up in that direction?

A. The river?

Q. Yes, sir, the river.

A. I have observed the river up through that part of the country.

Q. So you are generally familiar with the fact of the river coming down from the north and then turning and going westerly across the Great Northern railroad tracks and then into Section 20?

A. Yes, sir.

Q. Now, as the flood waters would occur at these times you have mentioned, they would overspread the land as you have de-
1770 scribed in Section 20 by reason of the channel of the Mustinka river not being able to contain them, that is true, isn't it?

A. Yes, sir.

Q. And also——

A. On joining the old river bed.

Q. As you have described in your testimony.

A. Yes, sir.

Q. And also at the northeast corner of Section 20 where the old Mustinka river goes, the waters there in flood times would get out of the banks of the Mustinka river?

A. Yes, sir.

Q. And would cross over into Section 17?

A. Yes, sir.

Q. And that happened in 1899——

A. 1900.

Q. 1900 and 1905?

A. No, 1906.

Q. 1906, possibly some of 1907?

A. Yes, sir.

Q. And in 1915 and 1916?

A. Yes, sir.

Q. Now, they came down some of these years, and in most of these years that you have mentioned, practically all of them excepting 1907 perhaps, in such quantities that not only was the old Mustinka river insufficient to keep them within the banks but also the Mus-

tinka state ditch, where it joins onto the river was insufficient to carry them off?

A. They were.

Q. Now, you say, as they went over in Section 17, they went north on the west side of the Great Northern track?

A. Yes, sir.

Q. And thence northwesterly and thence westerly?

1771 A. Yes, sir, northwest as far as I could observe.

Q. In a generally northwesterly direction?

A. Yes, sir.

Q. Now, these flood waters would run along this northwesterly direction as long as they kept coming down?

A. Yes, sir.

Q. And as soon as they started to recede, would the state ditch take care of them?

A. Yes, sir.

Q. After that?

A. Yes, sir.

Q. And they would pass down the ditch and would rather rapidly drain off?

A. The state ditch would take care of it at any reasonable water conditions, I believe.

Q. And the state ditch from the place where it joins onto the old Mustinka river westerly has cut off some bends and portions of the old Mustinka river westerly from Section 20?

A. Yes, sir, it leads down on the half section line on west something like four miles and then leads off across the section northwest and then due west again.

Q. As I understand you in these years that you have described in your direct examination when these flood waters came, it only filled the Mustinka ditch full of water and not only flooded across northwesterly but it also filled the old Mustinka river bed?

A. Yes.

Q. And the old Mustinka river bed formerly as it does now, runs in a westerly direction?

A. It does, follows the state ditch across it in places and follows it right on down.

Q. How near to your farm in Section 17 have you a ditch

1772 besides this Mustinka state ditch?

A. The road ditch is all, we have the road graded up.

Q. And that road grade leads how far before it cuts into a ditch?

A. At the present time there is a road ditch on west for three miles from my west corners.

Q. Is there a county ditch being constructed there this year, starting a mile west of the southwest corner of Section 17?

A. Yes, sir.

Q. That is on the road grade, isn't it?

A. Yes, sir.

Q. And that ditch will lead westerly into the old state ditch?

A. I think so.

Q. Have you driven along there?

A. I haven't been down that far but it leads into the old state ditch where the state ditch crosses the section to the northwest.

Q. Have you seen them digging there this year?

A. I was down to where they were digging this way a ways from the outlet, I wasn't at the outlet.

Q. Excavating on what is called on the map, county ditch #24?

A. I don't know the number.

Q. This is on the line between Sections 13 and 24 in Redpath township?

A. I think so.

Q. Do you know this ditch that is two miles west from the north line of Section 17, this county ditch that runs west into Twelve Mile creek and known as county ditch #9?

A. That is located a mile north of this other ditch, I know
1773 of the ditch.

Q. That ditch is northwest of your farm?

A. Yes, sir.

Q. And you also know this ditch known as county ditch #10, which is still a mile further north than that?

A. I heard it spoken of, I never was there.

Q. And that ditch is northwest of your farm?

A. Yes, sir, that is northwest.

Q. You mentioned to counsel about some waters coming along the track some time in the spring; would that be overflow water?

A. That is overflow water.

Q. Your land is so situated there, as I understand it, Mr. Christophel, that you get overflow waters by reason of the land being flat in such years as you have mentioned, of precipitation and flood waters coming down?

A. Yes, sir, or any other years, by reason of this Mustinka river, the way it is located there at this bend in the northeast of 20.

Q. Did you have a pretty fair crop this year?

A. We had it too dry this year, we had about half a crop.

Q. Did you plow last fall?

A. Yes, sir.

Q. Got your land all plowed?

A. We got our lands pretty well plowed up last fall.

(At this time recess is taken until 10 o'clock A. M., October 10, 1917.)

1774 October 10, 1917, at 10 o'clock a. m.

ANDREW GUNDERSON, being sworn in behalf of defendant, testified as follows.

Examined by Mr. Palmer:

Q. Where do you live?

A. I live at Wheaton, Traverse county, Minnesota.

Q. How long have you lived there?

A. I have lived there, I moved my family there in 1891, I commenced work there in 1890.

Q. How old are you?

A. I was born in 1852, that would make me 65 years old past.

Q. What is your business?

A. At that time I was in the employ of the McCormick Harvesting & Machinery Company from 1890 until 1896, and then I went from there to the Deering Company.

Q. What were your duties?

A. My duties with the McCormick people was collector, salesman, manager of agencies and expert work. What we meant by expert work was to go out and repair and look after binder in operation in the field.

Q. Your work was then almost exclusively with what class of men?

A. Farmers.

Q. Was your work confined exclusively to Traverse county?

A. No. Big Stone and Grant and part of Swift but a great deal of it was in Traverse county.

Q. Did it extend over in Richland county, North Dakota, and Roberts county, South Dakota?

A. I had no work to do there, except when claims for collections—it wasn't my territory—was handed me from the general
1775 agency. My work didn't extend—well, it did at White Rock, it took in White Rock, South Dakota, I had charge of the collections there but in Richland county I had none except such as came specially from the company.

Q. In 1890 did you immediately begin your work among the farmers?

A. Yes, sir.

Q. Did you become well acquainted with that part of Clifton township which lies easterly of the Twelve Mile creek?

A. Yes, sir.

Q. And with that part of Redpath township which lies easterly of the Twelve Mile creek and southerly from about the northern limits of the Tintah slough?

A. Yes, sir.

Q. And with that part of Logan township and Gorton township in Grant county which lies just easterly of the Clifton township and Redpath township lines?

A. Yes, sir.

Q. What was the condition of that part of Traverse county in 1890 as to settlement?

A. Oh, it was well settled, that is, reasonably well settled.

Q. Well,—that part of Traverse county and that part of Grant county I should say, would your answer be the same?

A. Well, perhaps that part of Grant county lying east of the town of Redpath, that would take in Norcross, it was fairly well settled but I wasn't so well acquainted over there, I didn't happen to have so much business there, and Logan was settled about the

same as Clifton, that is, right east of the township of Clifton, that part was settled.

Q. I wish you would compare that portion of Traverse county that I have mentioned with the rest of the county as to settle-
1776 ment.

A. I don't think—perhaps it was as well settled as the towns of Walls, Windsor and Arthur. That is my impression that it wasn't—it had been settled as long but I don't think it was as well settled or thickly settled, although it might have been. Walls and Folsom specially were reasonably well settled in those times.

Q. Was the territory of which I have spoken as well settled as the towns to the south of it—the town to the south of it and the town east of it?

A. The town east of it would take it into—yes, it was as well settled as the town east. The town east would take it into Grant county and the town south would take it into towns — Dollymount and Croke.

Q. Was this territory I have described just as well settled as Dollymount and Croke townships?

A. Yes, sir, I think so.

Q. As to the cultivation of the soil and the general prosperity of the farmers and the improvements upon the farms, what will you say about this territory I have described during the nineties?

A. Well, it was pretty generally well cultivated and there was farm buildings, of course, all over both those towns. I knew quite a few of them. It was as well settled as east of it and south of it but, as I said before, there might be more settlement down in Walls.

Q. What was the condition of the farmers on that territory which I have mentioned as to general prosperity?

A. They were as prosperous—a great many of them were new and all over the county and were hard-up at times, they were as prosperous as any of them. I had no more trouble in getting my money in that country than I did elsewhere.

1777 Q. Did you travel over this territory which I have described here in the spring of the year frequently?

A. The greatest part of my work, of course, was done during the summer as soon as the selling season would commence. We commenced in June and of course in the fall more than in early spring; but I traveled over it at all times of the year for that matter, I drove on every section line, I think, in the county.

Q. What did you observe, if anythnig, as to the condition of the lands in the territory I have described as to being wet or flooded with water?

A. What years do you refer to?

Q. Ordinary years?

A. Well, from 1900 up, you mean?

Q. No, from 1890 to 1900, in particular?

A. They were dry, the country was dry.

Q. That country was dry?

A. Yes, sir, that was the complaint, it was too dry to raise good

crops sometimes; at least, the farmers would holler about it being too dry, anyway.

Q. Were they hollering any about it being too wet?

A. Yes, I heard some complaint of late years. I have been out of the business since 1901 so I haven't been out amongst them.

Q. I am asking you particularly about this prior time from 1890 to 1900.

A. I heard no complaint of it being too wet in any of those years and I was farming it myself in those years. That is, I was farming at arm's length, and I know we wasn't troubled with water.

Q. Where were you farming?

1778 A. I was farming, I had a farm a mile south and a mile east of Wheaton, that was on a level piece of land. Then I had a quarter section right straight east of Wheaton on the Herman road, a mile and a half east of Wheaton, Lake Valley township.

Q. Would you say that these lands, so far as you observed them, in the part of Clifton easterly of the Twelve Mile creek and Redpath easterly of the Twelve Mile creek and the part of Logan township, Grant county, just easterly of the Clifton line, were as dry as the other lands around them, in those years?

A. Yes, sir, in those years they were, because all the lands were dry. Rainfall wasn't very heavy.

Q. What has been your occupation since 1900?

A. Well, 1901 I discontinued my services with the machine company and I went up to North Dakota. I was there personally for a couple of years in the land business at Carrington, North Dakota. I came back from there and went into the mercantile business at Dumont in 1907 and continued there until 1912, then I went into the hardware business at Wheaton, Minnesota.

Q. You are still in the hardware business?

A. No, I am not at present, I sold out and closed out in 1914; I was there only two years.

Q. During this time that you worked for the machine company from 1890 to 1900, did you visit these lands in what is called here the Bois de Sioux valley from White Rock on up to Fairmount?

A. Well, I went through them very frequently on the train, making my circuit around, coming from Campbell and around from Herman, sometimes I would come around that way. I rode through frequently on the train and I worked with the team—I kept a team all these times that I drove, and I worked with the

1779 team from White Rock and west into South Dakota as far as my paper extended.

Q. And did you work some northwardly up to Fairmount?

A. There was nothing to work to speak of. There was some farms—well, they are there yet—north of White Rock, and I drove from Fairmount down once in the nineties but I don't remember, down to visit a farmer by the Bois de Sioux on a collection, and which was about the only driving that I did there with teams.

Q. Where was this farm that you went to visit in the early nineties?

A. The farm I went to see was southeast of Blackmer.

Q. Over in Section 21, then?
A. I don't know as to sections.
Q. Southeast of Blackmer, you say?
A. Yes, sir.
Q. And on the westerly side of the Bois de Sioux?
A. It is on the westerly side, yes, sir.
Q. What kind of farm did he have in those days?
A. Well, he didn't have a very extensive farm. I don't know the name, but this farmer I went to see——

Mr. Bronson:

Q. Can you give the description of the land?
A. I can't give the description of the land.

Mr. Bronson: I object to this testimony as too indefinite.

Mr. Palmer:

Q. What kind of a farm did he have?

Mr. Bronson: I object to that as too indefinite, does not refer to any specific land, no way to cross-examine him on it.

1780 A. Of course, I can't say that I observed a great deal. I drove to the house, there was no trouble driving anywhere those days, you know, and I drove to the house and saw him. He was farming there, had buildings and below him there was another set of buildings, I don't know who that was though.

Mr. Palmer:

Q. South of that there was another set of buildings?
A. Yes, sir.
Q. What kind of buildings were those?
A. They were poor buildings; I think the remains of them stand there yet.
Q. And this man that you went to see, what was the character of his buildings?
A. They were poor buildings.
Q. Now, take those buildings that you observed there, what would you say of them as to general appearance of prosperity?
A. Well, there were a few buildings around Blackmer——
Q. I mean these two sets.
A. They didn't look very prosperous, no, sir; they were not prosperous looking.
Q. Did you have occasion to observe any more of the farms around in east of Blackmer on the Dakota side?
A. No, there was nothing east of Blackmer in the way of farms. Well, perhaps some of it was used for hay land in those days. It was low sloughs, low land.
Q. East of Blackmer and south of White Rock, were there any farms in there, do you remember?

A. Not until you got down close to White Rock. There was some buildings, I couldn't describe very much except seeing them from the train. I never visited them in a business way, close to White Rock.

1781 Q. What would you say about those buildings as to their general appearance of prosperity?

A. I seem to recollect not very far north of White Rock on the Dakota side there was an ordinary fair set of buildings and also northwest of White Rock a little ways there was some fair farm buildings.

Q. Did you visit any more of the farms on that flat land constituting the Bois des Sioux valley?

A. Not except west of White Rock, right west of White Rock.

Q. How far west of White Rock?

A. I couldn't be over a mile, I guess, it couldn't be over that; there was a farmer living there.

Mr. Bronson:

Q. When was this?

A. This was in 1902 or 3, along there some time that I visited this farmer that I spoke of west of White Rock.

Q. All this time refers to 1902 and 1903?

A. Yes, sir, it all refers to that period.

Mr. Palmer:

Q. Do you mean 1892 or 1902?

A. No, 1892.

Q. And 1893?

A. Yes, sir, I don't mean 1900.

Q. You understand, Mr. Gunderson, that I am trying now to cover the period from 1890 to 1900?

A. Yes, sir, I understand.

Q. This farmer you visited west of White Rock, what kind of a farm did he have?

A. Well, he had a dry farm——

Mr. Bronson: Objected to as too indefinite.

A. — quite a bit under cultivation, not very good buildings.

Mr. Palmer:

Q. What was the condition as to prosperity?

1782 A. Not very good, farmer's name was Steve Henderson. I was there quite often, trying to collect paper from him for a machine.

Q. Was he able to pay his bills?

A. He wasn't only very slowly and a little at a time. He was a willing payer if he could.

Q. Did you pass through that territory in this Bois de Sioux valley after 1900 frequently?

A. After 1900?
Q. Yes.
A. No, not very often.
Q. Have you had occasion to visit that territory this year?
A. Yes, sir.
Q. What date, Mr. Gunderson?
A. Well, 17th day of September, I believe, is the date we drove up through that country this year.
Q. How did you drive up through there?
A. Drove up with an automobile.
Q. Who was with you?
A. Mr. Houston and Thomas E. Dunn?
Q. What was your purpose in going there?
A. Purpose was to investigate the conditions of that tract as to crops and conditions.
Q. And did you make a general survey of the farms and the crop conditions in that Bois des Sioux valley?
A. We did.
Q. On the 17th day of September 1917?
A. We did, from White Rock north to the Rabbit river.
Q. Did you make a memorandum of the conditions you found there?
A. I did.
Q. Did you make this memorandum at the time and as you
1783 went along?
A. As we went along there, standing in the car—getting out.
Q. Have you with you the original memorandum which you made at that time?
A. I have.
Q. And without the use of that, are you able to give a detailed statement of the conditions there?
A. I am not.
Q. And by reference to that original memorandum are you able to give a detailed statement of the conditions as you found them?
A. I am as I found them and observed them.
Q. Will you kindly refresh your memory from your memorandum and make a statement?
A. I will. I have got it dated September 17, 1917. The west half of Section 3, 128, 47 we found corn in shock and some buckwheat, a field of buckwheat not harvested.
Q. This then is in Whiterock town, South Dakota?
A. Yes, it is in South Dakota, White Rock is in South Dakota, and we took what there was around north of White Rock and also south and west of White Rock, part of it.
Q. Perhaps you may as well give that, Mr. Gunderson, go ahead. This calls for only the crops and conditions on the westerly side of the Bois de Sioux river.
A. Yes, sir, I understand. We didn't go on the other side, we couldn't get there.
Q. All right, go ahead.
A. Section 9, 128, 47 and, I got it here, south of the north line

of Section 9, we counted 32 stacks of hay on this tract put up this season and three fresh straw stacks. East half of Section 9, I got again here, corn in shock, hay and pasture. West half of
1784 Section 4, I have got it marked Camerud place, this contained pasture mostly, as far as I could see. There was 50 or 60 head of stock in there. I think there was a small field of grain there, come to think about it. It was pretty hard sometimes to get the descriptions right. I had nothing to do with the descriptions, Mr. Houston gave the descriptions from the map he had. And the northeast of 4, 128, 47, six large stacks of hay. Southeast quarter of 4, 128, 47, there was eight acres of plowing this year, corn in shock, flax cut, about 15 acres of flax cut. Southwest quarter of 3, 128, 47, 40 acres or more, just estimated by looking at it, of this year's stubble.

Q. What kind of stubble?

A. It was small grain stubble, I do not know whether it was oats or wheat. I didn't go out to look at it at all. And corn, not cut. Northwest quarter of 3, 128, 47, I got noted here, buildings, pasture and slough. This is all of the South Dakota lands. Southwest of 34, 129, 47, in the State of North Dakota, and the following will be in the State of North Dakota, I got noted here buildings and big corn field. Southeast quarter of 33, 129, 47, pasture on east half. West half of northeast quarter of 33, 129, 47, all in oats in shock. Northwest of 34, 129, 47, 4 grain stacks west of railroad track, 11 hay stacks, barley and wheat in shock. Southeast of 28, 129, 47, pasture, no crop. Southwest of 28, 129, 47, stubble field, 25 or 30 acres, 3 hay stacks. Northwest quarter of 33, 129, 47, large field of wheat stubble. Southeast quarter of 29, 129, 47, corn field not cut, about 25 acres. Northeast quarter of 29, 129, 47, big corn field and fall plowing. Northwest quarter of 28, 129, 47, no improvements. Southwest quarter of 17, 129, 47, corn and pasture, 18 head of stock in the pasture. Southeast quarter of Section 17, same
1785 town and range, flax, about 30 acres, large 1917 straw stack, 1 hay stack and about 10 acres more of flax. Northwest quarter of 20, good buildings, corn, 7 hay stacks and pasture, about 15 head of stock. Northeast quarter of 20, grain in shock and stubble. Southwest quarter of 16, I have nothing marked for that. Southeast quarter of 16, 37 stacks of hay. In Section 21, I have got that marked east of Blackmer and it is slough.

Q. All slough?

A. Yes, there is nothing on there. Well, I don't know as there was any water in there particularly. It was grown up to weeds and rushes and tall grass and I don't know whether there was any water; we didn't go over in there because there was no buildings. Section 15, and that is marked east of Blackmer too, nothing there in the way of crops. In 22 nothing in the way of crops nor buildings. No buildings on any of this stuff east of Blackmer. Here I have got the northwest quarter of 16, big field of corn, summer plowing, 8 stacks of hay and I have got a notation here, what would be the northeast quarter of 17—I don't know whether I have duplicated some of this stuff or not, I am not quite sure, there may be a duplication here but it will show—I have it marked here, not under culti-

vation, level land, no slough. There is another in between—to explain this, in reading I may not get them in rotation as the sheets might be misplaced in tearing them out of the book. Here is southeast quarter of Section 9, 7 hay stacks. Southeast quarter of 8, I have got nothing, it says, nothing. Southwest quarter of Section 4, 129, 47, plowing; I have got a notation here, about 20 acres of fall plowing and about 20 acres of corn. I have got a notation that this piece was not all under cultivation. Southeast quarter of 4, 6 stacks of hay and a lot of hay cut and not stacked. That part of the north half of Section 4, that would be west of the Bois de Sioux, 12
1786 acres of flax, not shocked, fall plowing about 30 acres, 15 acres of green flax, 20 acres of green barley, about 30 acres buckwheat. It says here, the whole half section is under cultivation. Section 3, 129, 47, all slough. I got southwest quarter of 34, 130, 47, west of river, rushes and coarse hay and 1 stack of hay, I have got it marked of the part west of the Bois de Sioux. South half of 33, 130, 47, green flax, corn, all under cultivation, 8 grain stacks, large corn field, a few shocks of wheat and stubble and fall plowing, fine farm, I have got it marked, all under cultivation, good buildings. Nothing on the northeast quarter of 33 or that part of the north half west of the river, no buildings. That part of the southwest of 33 west of the river, no crop, no buildings. Southeast quarter of 28, pasture land covered with foxtail, no buildings. South half of 22, 130, 47, wild land, no crop except corn on the west side, about 7 acres; buildings on this, southeast quarter of Section 21, 130, 47, some corn but most all summer plowed. North half of 22, 130, 47. I got this marked east of Fairmount. It says: buildings, new breaking about 80 acres, balance slough, grass cut. That land looks as thought it had been cultivated but it wasn't under cultivation. That part of the south half of 15, 130, 47 west of the river, all wild land except about 5 acres of corn, 2 stacks of wild hay, no buildings, never been any, I have got it marked. North half of Section 15, west of the river, tame hay cut and some tame hay not cut, pasture, some flax, 1 stack of hay, 3 stacks of grain. The banks of the river about 7 feet high, I estimated that. South half of 10, 130, 47, west of the river, east part along the river good prairie land, 30 acres of plowing and some hemp on the southeast quarter and southwest of 10,
130, 47, poor crop of flax along the east side. That part of
1787 the north half of 10 west of the river, plowed land gone back along the river. Section 3, meadow hay cut. I didn't get the description on that 3 because here is the south half of 3 west of the river, hay cut and plowed this season. North half of 3, I have got it marked, all tame hay, cut on west quarter, not cut on the east part except small strip of wild hay along the river bank, cut and taken away, high land. South half of 32, 129, 47, 2 stacks of hay, stubble along west side line, mostly all slough and water. Here is a sheet that has got misplaced, this takes it back to 20 again, southwest of Blackmer, 129, 47. Southwest quarter of 20, stubble and flax, good land except 60 acres of slough, small strip of corn on the west side. Southeast quarter of 20, marked corn and stubble. I have got the northwest quarter of 29 all under cultivation, grain not

shocked, fall plowing. Northeast quarter of 29, corn, about 80 acres of stubble, all good land.

Q. Mr. Gunderson, did you assist Mr. William Ringdahl in making some measurements of the old channel of the Mustinka river and of the cut-offs made by the Mustinka state ditch over that part of the river northwesterly of Wheaton where the cut-offs of the ditch are found?

A. I did.

Q. Did you put down the figures?

A. I did, of each cut and each river bed.

Q. You measured all the cut-offs that occurred?

A. Yes, sir.

Q. After the mouth of the main cut-off at the north?

A. We commenced at what we call Martin Isaakson's cut, that is where the dredge that did the work now stands, that is where they quit, and we measured the cuts and the river beds from there including the Martin Isaakson cut, until we got including Tom
1788 Heggen's cut north of Wheaton.

Q. That took them all in?

A. That took them all in, between there and what is termed the Swedish church in the town of Monson.

Q. I will not ask you about the details of these measurements, Mr. Rindahl has given those. Will you tell me the total measurements of the cut-offs?

A. I have them here. The river beds measure——

Q. Well, the cut-offs and the river beds.

A. The river beds measure 17,789 feet and the cuts measure 3,532, leaves a difference of 14,257 feet.

Q. That is, the several bends of the old river channel are 14,257 feet more in length than the cuts?

A. Yes, sir.

Q. And you measured these with a steel tape, did you, as testified to by Mr. Ringdahl?

A. We measured them with a steel tape 100 feet long.

Cross-examination.

By Mr. Bronson:

Q. Mr. Gunderson, in making these measurements you took, about where did you start?

A. Of the river?

Q. Yes.

A. We started at what we called the Martin Isaakson cut, that is the end of the ditch, and we measured up towards Wheaton.

Q. Up towards Wheaton?

A. Yes, sir, up towards Tom Heggen, that is right north of Wheaton, there is the last cut there.

Q. From the Heggen cut-off down to the Isaakson cut-off,
1789 A. Yes, sir, inclusive.

Q. That is all the measuring you did?

A. That is all we measured.

Q. Who asked you to do it?

A. Mr. Ringdahl asked me to assist him.

Q. And when you went up there to look at those farms along the Bois de Sioux river, who asked you to go?

A. Mr. Houston.

Q. For the purpose of testifying in this case?

A. For the purpose of making the observations.

Q. To testify in this case?

A. There was nothing said about my testifying in the case at that time.

Q. You made the memorandums?

A. I made the memorandums in case it was needed. I presume that was the object of it, in case it was needed, in case it was necessary. He didn't say he wanted me to go down and testify at that time but he wanted me to go with him to write down the observations as we made them, we all made the observations.

Q. You went along in an automobile?

A. Yes, sir.

Q. Made the observations from an automobile as you rode along?

A. Yes, sir, we would take a line going north and the section line to the river, back and forth.

Q. And these conditions that you have related from the memorandum which you read, are the visual conditions as you saw them on September 17, 1917?

A. Yes, sir.

Q. And not any other time?

A. No, not to refer to these figures.

1790 Q. Not any other time?

A. No, sir.

Q. Did you see the same land in 1916 as you have described?

A. Yes, sir.

Q. Were you up there in 1916?

A. No, not in 1916, no, sir.

Q. Were you there in 1915?

A. No, neither of those years I was up through there that I remember.

Q. When had you been up there before?

A. I hadn't been up, except riding through on the trains several times during the years since 1900.

Q. Did you notice any cattails growing on some of the land, as you went along?

A. From the train, you mean? At this time when I investigated?

Q. Yes.

A. Yes, I made a note of one or two places where I saw cattails. It is really foxtail is what I mean to say; if I said cattail I made a mistake.

Q. As you drove north from White Rock and a mile east towards Fairmount, did you see any cattails growing on farms or standing on farms? Do you know what I mean by cattails?

A. There was only that one description I noticed it that I mentioned here.

Q. You call that foxtail?

A. We may not understand each other.

Q. Do you know what a cattail is?

A. I really don't know as I do. Foxtail is this small, fine grass that grows in meadows sometimes, that is what I call foxtail.

1791 that is what I mean by that. Cattail is a high weed, isn't it?

Q. A kind of a tail——

A. And foxtail is grass, really.

Q. Do you know what cattails are?

A. As I understand a cattail is a tall weed. I know them when I see them. It is a tall weed with what we might call a long——

Q. A bushy head.

A. And foxtail is what grows in a meadow and is a detriment to hay. It isn't good hay, it is a detriment to hay.

Q. As you drove up through this land—I speak of cattails as being of tall weed-like character, perhaps 3½ to 4 feet high consisting of a single rib with a top or head to it, perhaps somewhat in the shape of a candle and brownish in color.

A. That is my understanding of cattails.

Q. Did you see any of these cattails growing on any of these farms or standing on any of these farms?

A. No, sir, I don't think so.

Q. Will you say there were not some there?

A. There might have been some down in the sloughs, down towards the river. I didn't see any on any farms that I can recollect. If I said cattails on any farms I made a mistake, I meant foxtails.

Q. Some of the witnesses have testified about many of the farms as they drove south from Fairmount and a mile east of Fairmount south towards White Rock were covered with cattails, is that correct?

Mr. Palmer: I don't think there has been any testimoney of that kind in the case.

A. I didn't see anything of that kind.

1792 Mr Bronson:

Q. As you drove up you went by Blackmer?

A. Yes, sir.

Q. Then went east of Blackmer to the road and then went north?

A. Yes, sir, we went east and west and go north to the next section line and then across.

Q. You tell us where you drove?

A. I couldn't do it except I worked the lines, worked the section lines east and west.

Q. All up through this territory?

A. All up through this territory.

Q. You observed every farm?

A. Every piece of farm that was——

Q. That you were directed to observe?

A. Mr. Houston gave the descriptions of the land..

Q. Look at this map, Complaintant's Exhibit 1; you see a yellow shaded territory there, do you not?

A. Yes, sir.

Q. Generally speaking, did you observe on the west side of the river all of those lands?

A. We did.

Q. And as I understand it, you drove through White Rock with an automobile?

A. Yes, sir.

Q. And then drove up between Sections 33 and 34 north of White Rock?

A. We drove here and then we drove up there, and then we drove out here and back again.

Q. As I understand it, you drove from White Rock then west a mile?

A. Yes, just about a mile.

Q. And then north?

A. Yes sir.

Q. A mile?

1793 A. Yes, sir.

Q. And then east?

A. Yes, sir.

Q. And then north another mile?

A. No, we didn't—is this the river? (indicating).

Q. That is the railroad track.

A. I think we went back there again a great many times and when——

Q. But generally speaking, you traversed practically every section line all the way up through the territory?

A. Yes, sir.

Q. And had an opportunity to examine all these farms as you drove up through that territory?

A. Yes, sir.

Q. I will ask you to state whether or not in Section 16, township 129, 47, there isn't at least 100 acres grown up into cattails?

A. Well, now, as to the description of these lands——

Q. Refer to your notes and look at it?

A. I don't know as I have anything on 16; did I have anything on 16?

Q. Refer to your memorandum and see.

A. If I had anything on 16 I saw it, if I didn't, I didn't. You mean 16 in North Dakota?

Q. Sure?

A. I have got here the southeast quarter of Section 16, 37 stacks of hay.

Q. You didn't observe any cattails, as I understand it, on Section 16?

A. Not that I know of, I got nothing in the southwest quarter of 16.

1794 Q. And did you observe any cattails growing on Section 9 west of the river, same township and range?

A. I did not because I didn't look for them anyway, and there might have been and there might not.

Q. If they were there you could have seen them?

A. I presume I could.

Q. And did you observe any cattails on Section 4, same township and range?

A. Not that I noticed, I wouldn't say there wasn't any there, I wouldn't testify about that.

Q. You testified about the general prosperity of the lands in Redpath and Clifton townships.

A. Yes, sir.

Q. In the years you have mentioned in your testimony?

A. Yes, sir.

Q. Did those lands in 1917, at the time you went up there appear to be prosperous and well settled, September 17, 1917, at the time you made these observations?

A. You mean up along that——

Q. Yes.

A. Along that strip of land? When I got up by Fairmount *mount* and up through there, that looked all right; of course, down north of White Rock—at Blackmer there has always been some fair farm buildings.

Q. You have testified generally about Redpath and Clifton townships and the general prosperity of the farmers in that vicinity and cultivation of the land. Now, I am asking you whether or not, as you made the observations on September 17, 1917, of these lands in this yellow shaded territory, whether or not they were then in a high state of cultivation, apparently well farmed and raising crops, good substantial crops upon the same?

A. No, sir.

1795 Q. You say not?

A. I would say not.

Q. You say that between the years 1890 and 1900 this territory in Redpath and Clifton township- in Traverse county was dry?

A. Yes, sir.

Q. Always dry?

A. Well, now, in 1897 there was quite a rainfall and I wouldn't say that it was—it is level land, you understand, and I wouldn't say that it was always dry, but there was no heavy rains in those years. 1897 to my recollection is the heaviest rain we had in that period of ten years but that was in the spring so I don't know to what extent it affected the land.

Q. Counsel asked you about your familiarity in your business with farmers in portions of Grant County, that would be in Gorton and Logan townships in Grant county, and also I think general familiarity with farming conditions in Traverse county?

A. Yes, sir.

Q. And I believe that you stated in response to one question that

you thought that Windsor and Folsom townships were possibly a little bit better settled than Redpath and Clifton?

A. Yes, sir.

Q. Is there any difference in the lands in Folsom and Windsor townships as to their rolling character of being better drained than those of Redpath and Clifton?

A. Yes, sir.

Q. What difference?

A. Difference in favor of the town- of Walls and Folsom; the towns of Walls and Arthur and Folsom for those towns are more rolling.

1796 Q. And the lands are naturally better drained?

A. Better drained.

Q. As I understand it then, you haven't much familiarity with the conditions in North Dakota only this territory you have observed on September 17, 1917, prior to that time?

A. Only as I stated, I went through on the train very often and then that particular drive to that farmer southeast of Blackmer.

Q. But you don't pretend to have the actual experience with the farmers and with the farming territory that you had in Redpath and Clifton townships, for instance?

A. No, sir.

Q. Because your business in the early days took you over to the farm lands in Traverse county?

A. Yes, sir.

Q. More extensively than it would in North Dakota?

A. Yes, sir.

Q. You have been at Norcross, I presume, at different times all these years?

A. Yes, sir.

Q. Do you remember about the flood at Norcross and west of there in the spring of 1899?

A. Not from personal knowledge, no.

Q. Did you ever see any flood waters over the banks of the Mustinka river near Norcross in 1899?

A. I did not; I wasn't there that time.

Q. Were you up there in the summer of 1900?

A. Yes, sir.

Q. About harvest time?

A. Yes, sir—no, in 1900, I got mixed between 1890 and 1900, not in 1900.

Q. Were you in the summer of 1906?

1797 A. No.

Q. Or in the year 1907?

A. No.

Q. Or in the year 1915?

A. Well, I was up through there, I guess, I don't know exactly the year, just drove up through there, that is all.

Q. Do you know Mr. Rogers?

A. Dennis Rogers?

Q. Edward Rogers.

A. Yes, sir.
Q. Have you ever been out to his farm?
A. Yes, sir.
Q. Have you ever seen any water standing on his farm in any of the years?
A. Not in any of the years that I worked that territory.
Q. Have you ever seen any of these lands in either Redpath or Clifton township overflowed any time?
A. No, sir, not when I was working in the territory between 1890 and 1900.
Q. Have you seen them since?
A. Well, I haven't; as I stated before I have not been driving around the country much since that time because I was away.
Q. You don't know much about the conditions there?
A. Except what the farmers told me.
Q. I presume generally when driving over the country it was in the fall, attending to collections?
A. I done no collections since 1898, I was more of a general man after that, until I quit the business.
Q. How long were you making these observations September 17th, just one day?
1798 A. One day, yes, sir. We started early in the morning and got back to Wheaton 8 o'clock or so in the evening.

THOMAS E. DUNN, being sworn in behalf of defendant, testified as follows:

Examined by Mr. Palmer:

Q. Where do you live?
A. Wheaton, Minnesota.
Q. How long have you lived there?
A. I lived there since 1886.
Q. How long have you lived in Traverse county?
A. I came to Traverse County in 1878.
Q. How old a man are you?
A. I am only 67.
Q. Where did you settle when you came to Traverse county in 1878.
A. In the northwest quarter of Section 4, 126, 47.
Q. That would be the township of Croke?
A. Yes, sir, about three miles below Wheaton.
Q. Did you take that as a homestead?
A. I did.
Q. Improved it and farmed it?
A. Yes, sir.
Q. How long did you live on that farm, Mr. Dunn?
A. I was on the farm—I farmed there for four years myself, five years.
Q. Then where did you move?
A. I moved up to Wheaton.
Q. Have you since lived continuously at Wheaton?

A. Yes.

1799 Q. What has been your business there?

A. I went in the livery business.

Q. How long have you been in the livery business?

A. I am there yet. I sold machinery with that three years for McCormick in 1887, 1888 and 1889, something like that, then I quit it.

Q. In the livery business did you have occasion to drive out over the country?

A. When I first started I done all the driving myself mostly, I was driving every day. There was no automobiles then.

Q. How far was your farm from the southern limits of Clifton township?

A. It is about 5 miles.

Q. How far is Wheaton from the southern limits of Clifton township?

A. Well, Wheaton is 5½ miles straight to Clifton.

Q. Did you soon after your settlement in Traverse county, come to know that part of Clifton township which lies easterly of the Twelve Mile creek and that part of Redpath township which lies easterly of Twelve Mile creek and southerly of the northern limits of the Tintah slough region?

A. Yes, sir, I have driven all over there. I was deputy sheriff and am yet and I had to get witnesses for court and I have been driving it all the time.

Q. Summoned jurors?

A. Yes, sir, summoned jurors, and so on. I have helped to get settlers. I got Mr. Denny Rogers to come and the year after I got a Mr. Sargent to come and settle in Clifton.

Q. That is the witness, E. D. Rogers, who has been on the stand?

A. Yes, sir.

Q. That part of the towns of Logan and Gorton in Grant county which lies immediately east of the Traverse county line,

1800 did you become familiar with that soon after you came there?

A. I got very familiar hauling wheat across there.

Q. To what place?

A. On the Herman flat was the only trouble we had to get into Herman with the loads of grain.

Q. Where was that flat?

A. It was west of Herman about two miles out from Herman. We called it the Herman flat along there.

Q. About two miles west of Herman?

A. Yes, sir, that is where we had trouble getting across.

Q. How wide is the flat?

A. About two miles wide.

Q. That didn't extend over into the town of Clifton?

A. No, sir. Just about two miles of it, the rest of it was pretty good down to that river, Five Mile creek, that joins with Clifton. We had an early road run through Clifton, we drove angling through it; an old train went angling through Clifton in the early days.

Q. Angling through Clifton from what directions?

A. Come in from the southwest and angled right out north until we got on the county road again. Now they opened up the state road.

Q. What is that road?

A. Leading from Browns Valley clear to Herman on the section line straight, where the ditch runs along now.

Q. I want to ask your attention particularly to that part of Clifton township which lies easterly of the Twelve Mile creek and that part of Redpath township which lies easterly of the Twelve Mile creek and south of the Tintah slough region and the parts of Gorton and Logan in Grant county which lie immediately east of the Grant county line; you have that territory in mind?

1801 A. Yes, sir; I have been over it all, I have threshed through it.

Q. Did you state that you had threshed through that country?

A. Yes, sir.

Q. When?

A. I threshed in 1881, 1882 and 1883 with a horsepower machine.

Q. Around that same territory?

A. I threshed through Clifton township and Logan and I threshed north of Herman for three years.

Q. That was 1881, 1882 and 1883?

A. Yes, sir; of course, they didn't have so much grain them days.

Q. Let us begin then with 1881, 1882 and 1883, Mr. Dunn, and tell us something about the settlement of that particular territory at that time.

A. Well, those settlements—the settlers that first came in settled along the river beds, they took their lands along the rivers, most of the early ones and they calculated to get water handy for their stock, and the next settlers, of course, later on, had to take the prairie back of them. That was all nice level prairie and good grass and good hay land. Then they kept on settling for years afterwards, until they got it settled up.

Q. In 1881, 1882 and 1883 in that particular territory that I have described, what about the number of settlers?

A. Well, there was quite a good many of them, they were all along the rivers. I had in them years, in Clifton I think I threshed for ten or eleven, in 1881. There wasn't quite so many in Redpath because they hadn't got settled so thickly yet, but the last years they were settled pretty well. They got settled so they got ma-

1802 chines of their own and I didn't have to go up in that country any more.

Q. That was in 1883?

A. Yes, sir.

Q. What was the condition of their farms up there as to——

A. They had pretty fair buildings. Some of them was batching it, young men taking their quarters, nice buildings, and quite a few families along the river bed put up good houses to live in but the young men, of course, they built small buildings. Some of them sold out again.

Q. How were their farms as to crops?

A. They raised very good crop in the early days, ran from 20 to 25.

Q. And the general prosperity of the farmers through that section?

A. They was all doing well.

Q. What about their lands being overflowed with water in those early days?

A. We got a couple or three times a very heavy rain flooded a little while but it soon ran off.

Q. Did it interfere with their farming operations?

A. No, sir, the only trouble would be in the spring with the snow melting. It took it two or three weeks to get run off then clear right off the prairie and all. They wouldn't be over a week later than that up on the heights west of Wheaton.

Q. Did you observe those creeks, Five Mile creek and Twelve Mile creek?

A. I forded them and drove over them hundreds of times.

Q. How about their overflowing and flooding the lands adjoining them?

1803 A. In the spring of the year when they would be filled up with ice and snow we would have to kind of lay up sometimes three days and sometimes only two days in the spring for the ice and water jam on the bridge and in about three days it would be gone so that I could cross again.

Q. What about the streams overflowing and flooding the lands or farms?

A. They would flood only on some of the low points for a couple or three days until they got a channel cut, then it would run right off.

Q. Were there other channels there besides these Five Mile and Twelve Mile creeks?

A. Yes, those ravines that feeds them always had water running in them.

Q. Are those ravines as numerous there now as they used to be?

A. They plowed them up, most of them, except the very deepest of them. There was two or three of them and they was down a little too low; they run mostly northwest.

Q. From 1883 at the time that you threshed there on up through to say 1896, did you observe that country from time to time?

A. There was two years there I wasn't much up in through there, I farmed and then threshed around home more.

Q. What two years were those?

A. 1885 and 1886, I wasn't up there as much in that time.

Q. You were carrying on your farm then?

A. Yes, sir, and threshed it around home with a steam rig that I had.

Q. I was going to ask you when you were up in there threshing in 1881 and 1882 and 1883, was your threshing machine

1804 quite a large heavy machine?

A. Yes, it was the largest horsepower machine they made in them days.

Q. Did you have any difficulty in getting around over the land?
A. Not at all, I could go anywhere over that territory.
Q. When was it that you moved to Wheaton and went into the livery business?
A. 1886.
Q. And from that on until 1896, we will say, did you know this territory up in Clifton and Redpath and just over the line in Grant county that I have described very intimately?
A. Yes, sir, in 1898 I was in the machine business, selling machinery and likewise deputy sheriff and I was there every few days back and forward all through the county. We had one sheriff who let me do all the work for about six years.
Q. What six years were those?
A. 1888, 1889, 1890, along in there.
Q. When were you first appointed deputy sheriff, do you recollect?
A. Well, I was constable all the time in Wheaton and I was always doing constable work until I was appointed deputy sheriff, that was along in 1888, I guess.
Q. How long were you deputy sheriff?
A. I am deputy sheriff yet.
Q. And have been all the time since 1888?
A. All but two years.
Q. What two years were those?
A. That is about six years ago, I think.

Q. Mr. Dunn, who did this particular territory that I
1805 have mentioned settle up, compared with the territory around it in other townships around it?

A. Well, there is—it settled up slower than what it did out west of us because that was settled before I came up there, the year before I came there was about thirty families moved from our country in Wisconsin and moved up there.
Q. But compared with Dollymount and Croke?
A. From that on it settled just the same in the valley, they kept settling Redpath and Clifton about equal only about two or three sections which was over towards Norcross.
Q. What were those called?
A. They thought they was better for hay and they got good hay out of it and some of the farmers told these settlers it was good hay land.
Q. Is that what has been spoken of as the Redpath sloughs?
A. Yes, sir, that is what they called it; they called it the slough land.
Q. How were those Redpath sloughs in those early days, were they filled with water?
A. Part of the time there would be water in them in the spring, it would run off so that they had always good hay; I bought hay of them lots of times.
Q. Did they cut it all?
A. No, sir, they didn't ever in those days.
Q. I mean, could they have cut it all?
A. Yes, sir, they could have.

Q. You are familiar, I suppose, with the value of farm lands in Traverse county?

A. I am.

Q. And have you ever since you have been there?

A. Yes.

Q. What would you say as to the development and rise
1806 in values of farm lands in this particular territory I have mentioned as compared with the farm land values through Traverse county?

Mr. Bronson: Objected to as incompetent and immaterial.

A. The lands out through there is getting about as dear as anywhere. They ask 50 and 65 dollars an acre now for those lands right below Norcross.

Q. How were they in the early days out there in the town of Clifton and the southern part of Redpath?

A. In the early days the land—it was from 7 to 15 and 20 dollars.

Q. How did that compare, say, in Dollymount and Croke?

A. Dollymount and Croke was about the same prices.

Q. What I want to attract your attention to particularly, Mr. Dunn, is whether or not those lands in Clifton township and in Redpath township and just over the line in Grant county, which I have particularly mentioned here, were of less value than other farm lands on account of their having more water on them?

A. No, sir, not at all.

(At this time recess is taken until 2.00 o'clock p. m., October 10, 1917).